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This historic picture shows the first successful jet-assisted take-off of an airplane in the United States, at March Field, California on August 12, 1941. Pilot, Capt. H. A. Boushey (now a General)

THE AIR FORCE HISTORICAL FOUNDATION

The Airpower HISTORIAN

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All pictures in this issue are from official Air Force photographs. The editors of *The Airpower Historian* wish to express their gratitude to Miss Virginia Fincik, Photographic Records Division, Headquarters, USAF, for her assistance in selecting the pictures used to complement the articles in this issue.

It is the policy of *The Airpower Historian* neither to endorse nor subscribe to the views expressed in the articles it presents. Many events in history must perforce remain controversial by reason of the multiplicity of interpretations given these events by those who participated in them, or have studied them from hindsight. Appropriate articles are invited for consideration.

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THE AIR FORCE HISTORICAL FOUNDATION

CHIEFS of the ARMY AIR FORCE 1907-1957

By WALTER T. BONNEY

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THE PEGASUS

THOSE were robustious times, the days of a half century ago. Seeking our manifest destiny, in diplomacy and in war we had become, almost against our will, a great world power. Our President was the man whose way was the strenuous life . . . "Speak softly and carry a big stick; you will go far."

The big ditch was being dug across the Isthmus of Panama . . . Oklahoma was admitted, the 46th of the States within the Union . . . the Oil Trust, in the process of being "busted," was still squeezing more kerosene than gasoline out of every barrel of crude; there were fewer than 500,000 automobiles and no good roads, but . . . Henry Ford was fixing to build his Model T . . . DeForest patented his Audion—the three-electrode, vacuum tube that revolutionized the world of electronics . . . the first of the synthetic resins, Bakelite, was being perfected . . . two years before, Einstein wrote on a scrap of paper, $E = mc^2$ . . . .

Teddy Roosevelt had said, "Far better it is to dare mighty things, to win glorious triumphs, even though checkered by failure, than to take rank with those poor spirits who neither enjoy nor suffer much, because they live in the gray twilight that knows not victory nor defeat." And the people of the United States of America believed.

On August 1, by a swift stroke of his pen, Brig. Gen. James Allen, Chief Signal Officer of the Army, set in motion the mysterious, inexorable process that, accompanied by all the sharp pains of growth, resulted finally in the US Air Force—the mightiest concentration of mobile power in all history.

What follows, in briefest form, is something about the men who, in good times and bad, for better or worse, have administered the destiny and the fortunes of our military aviation.

1907-1913

OFFICE Memorandum No. 6, issued August 1, 1907 by the Office of the Chief Signal Officer, US Army, was terse. It stated simply:

"An Aeronautical Division of this office is hereby established, to take effect this date.

"This division will have charge of all matters pertaining to military ballooning, air machines, and all kindred subjects. All data on hand will be carefully classified and plans perfected for future tests and experiments. The operations of this division are strictly confidential, and no information will be given out by any party except through the Chief Signal Officer of the Army or his authorized representative.

"Captain Charles DeF. Chandler, Signal Corps, is detailed in charge of this division, and Corporal Edward Ward and First-class Private Joseph E. Barrett will report to Captain Chandler for duty in this division under his immediate direction."

BRIG. GEN. JAMES ALLEN

The man who signed it, Brig. Gen. James Allen, was a graduate of the Military Academy in the class of 1872. Until 1890, when he transferred to the Signal Corps, he was a Cavalry officer. In 1898 he sent the first news that Cervera's fleet had been bottled up in Santiago Harbor. Over the years, he served in Cuba, Puerto Rico, the Philippines and Alaska, advancing slowly through the grades. When he took over as Chief Signal Officer on February 10, 1906, the practicability of the airplane had yet to be recognized. (The year previous, the Wright brothers flew nonstop for more than 20 miles, but they made their flights without public notice.) Within the Signal Corps, however, there was heightened interest in balloons and dirigible airships.

In his first year as Chief Signal Officer, Gen. Allen authorized purchase of two free balloons, bringing to 10 the number of captive and free balloons bought by the Army since the Civil War. By the end of 1906, a number of Army officers had made flights in free balloons. Lt. Frank P. Lahm of the Cavalry won the first Gordon Bennett international balloon race. Maj. Samuel Reber and Capt. Chandler made ascents and joined the Aero Club of America.

While at St. Louis in October 1907 for the start of the second Gordon Bennett race, Gen. Allen saw and was impressed by Tom Baldwin's small, nonrigid dirigible airship. Upon his return to Washington, he arranged for purchase of a slightly larger airship, which Baldwin delivered to Fort Myer in the summer of 1908.

This preference for balloons and dirigibles continued until late in 1907 when White House pressure caused the Army to confer at last with the Wright brothers and then to invite bids for a "heavier-than-air flying machine," capable of 40-mph speed and 125-mile range. Once the potential of the airplane was demonstrated, however, Gen. Allen supported consistently the requests of his small aviation group. Even the tragedy September 17, 1908 that took the life of Lt. Thomas E.

Selfridge and injured seriously Orville Wright failed to weaken the new-found conviction that it was the airplane that held greatest promise for military use.

From its beginning, the Aeronautical Division of the Signal Corps suffered from a lack of funds. Despite Gen. Allen's yearly requests, it was not until March 3, 1911 that Congress appropriated the first money specifically for purchase of airplanes—$125,000 (he had sought $1,000,000). Equally critical was the problem of personnel. Officers detailed to aviation duty were detached from their regiments and were subject to recall at any time. Five times between 1909 and February 1913, bills were introduced in Congress to make legislative provision for Army aviation, but without avail.

On February 13, 1913, having reached the age limit of 64, Gen. Allen retired. Despite the disappointments and the difficulties, he could take satisfaction in the knowledge that progress, real progress, had been made in military aviation. His had been the opportunity of putting into the hands of American officers for the first time the new, winged tool of war.

1913-1917

BRIG. GEN. GEORGE P. SCRIVEN was hailed as "another friend of aviation" when he took over as Chief Signal Officer. For the previous two years he had served as Allen's assistant. He was no aviator but he had been a passenger on several flights.

Gen. Scriven's military career began at West Point where he was graduated in 1878, ranking fifth in his class. As a young officer, he served in both the Infantry and the Artillery. In 1890 he was transferred to the Signal Corps, and was military attaché in Mexico and Europe. He served in the Philippines and in Cuba; he was Chief Signal Officer of the China Relief Expedition in 1900, and twice was cited for gallantry. He wrote much on military subjects, especially on the transmission of military information.

BRIG. GEN. GEORGE P. SCRIVEN

One of the first problems he faced amounted to an insurrection by officers assigned to aviation. Embittered by the alarmingly high rate of fatal airplane accidents, they had drafted a series of demands which—disregarding channels—they sent direct to his office. In later years Gen. H. H. Arnold (attached in 1913 to the Aeronautical Division office) recalled he had recommended that the men involved be removed forthwith from aviation duty and sent back to their regiments. Instead, Scriven in the months that followed wrought minor miracles, finding ways to grant most of the demands without losing control of the situation. In September 1913, Gen. Scriven secured Lt. Col. Samuel Reber to be in charge of aviation. This assignment of a senior officer to head the Aeronautical Division had good effect, especially since Reber had been rated a pilot (balloon) since 1911.

In 1913 also, Gen. Scriven was called upon to testify on a bill introduced in the House to create an Aviation Corps as a separate combatant branch of the Army. Although he was sympathetic to any plan that promoted aviation, he said he doubted the time was ripe for action

such as was proposed. On July 18, 1914, another bill, H. R. 5304, was approved, giving for the first time statutory recognition to military aviation by creation of an Aviation Section as part of the Signal Corps. The number of aviation officers, including students, was raised to 60! At the time, the Army had only 28 airplanes, in varying states of repair, mostly poor. Within days, what was to become World War I had begun.

For the next two and a half years, growth of military aviation in the United States continued at a pace that was agonizingly slow. The sorry showing of our military aviation on the Mexican border in 1916 was due to the tiny sums that previously had been made available. Until his retirement February 13, 1917, Gen. Scriven was never under false illusions. (When charges of deplorable conditions in the Aviation Section were made in Congress, he was censured by the War Department.) But he never stopped fighting for the advancement of his Aviation Section.

1917-1918

THE third and last of the Chief Signal Officers to be responsible for military aviation, Maj. Gen. George O. Squier, was the man who in 1907 recommended that Gen. Allen set up the Aeronautical Division. He assisted in preparing the specifications for the first military airplane; he was president of the board in charge of the acceptance flights in 1908 and 1909. He was flown by the Wright brothers.

A graduate of the Military Academy in 1887, Squier was a scientist as well as a career officer. He had an earned doctorate from Johns Hopkins University. He developed ways to speed up telegraphic transmissions and was an authority on electro-magnetism.

In May 1916, Squier was called back from London, where he had been military attaché four years, to be officer-in-charge of the Aviation Section. By virtue of this foreign experience, he could and did speak with candor and authority: "We are very much behind Europe, which under the spur of war has gone forward in a marvelous way . . . The flying movement abroad is simply prodigious."

When he took over as Chief Signal Officer the following February, our involvement in the war had become certain. Squier's job was to direct an explosive expansion of military aviation. (In all the years before the war, less than $16,000,000 was appropriated for aviation—at the beginning of 1917 we had fewer than 350 planes, most of them obsolete.) Only months before, the public had been apathetic. Now it demanded the skies be darkened by US airplanes—overnight.

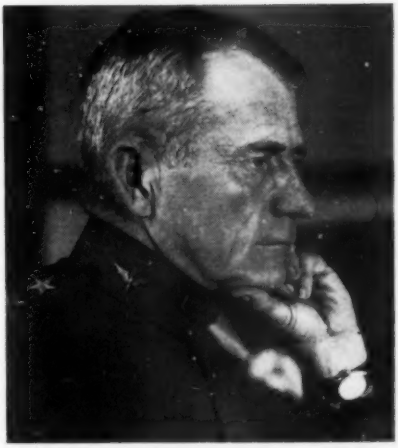
MAJ. GEN. GEORGE O. SQUIER

We declared war on Germany on April 6. By the end of May, the Signal Corps had drawn its blueprint to provide air power. The plan, as Gen. Squier explained in the properly purple prose demanded by the emergency, was to "put the Yankee punch into the war by building an army in the air, regiments and brigades of winged cavalry mounted on gas-driven flying horses."

Passage of the Aviation Act with its

$640,000,000 price tag was no easy thing, despite all the public clamor for action. The proposals to produce 40,000 planes, train the pilots and do all else that was required to build the needed air armies were entirely those of Gen. Squier's Signal Corps. As late as July 4, the Army General Staff had not approved the project—in fact, General Staff approval never was given.

Finally, Gen. Squier made an unprecedented end run and took his plan to Secretary of War Newton D. Baker, who authorized its submission directly to Congress. Within three weeks it was passed by both Houses, and on July 24, President Wilson signed the bill. It was the largest single appropriation in our country's history. It was Gen. Squier's greatest contribution to the air arm.



MAJ. GEN. WILLIAM L. KENLY

1918-1919

BY the spring of 1918, military aviation had grown enormously. Starting from scratch, some 5,500 trainers had been delivered. The Air Service was up from 65 officers and 1,100 men to 12,000 officers and 135,000 men.

And yet, largely because it had been led to expect too much too fast, the public—and the Congress—was bitter and alarmed by sensational charges of delay, incompetence, and worse. Perhaps the greatest disillusionment was realization that for months to come, most of our pilots overseas would have to fly foreign-built fighters.

On April 24, President Wilson took drastic action. Maj. Gen. William L. Kenly, who had been Chief of Air Service, American Expenditionary Forces, and then Chief of Staff, General Headquarters, AEF, was recalled from overseas to replace Brig. Gen. Alexander L. Dade as head of the Division of Military Aeronautics under Gen. Squier in the Signal Corps. Kenly was responsible for pilot training and military use of airplanes. At the same time, John D. Ryan, president of Anaconda Copper, was put in charge of aircraft production, succeeding Howard Coffin.

The following month the President, using the full power of the recently passed Overman Act, divorced military aviation from the Signal Corps. Gen. Kenly remained in charge of the now independent Division of Military Aeronautics.

Thus, as Gen. Peyton C. March, at the time Army Chief of Staff, observed, there was created a "fourth . . . arm of the Service."

In point of time, most of Gen. Kenly's military career was in the Artillery. A West Pointer in the class of 1889, he was twice awarded the Silver Star for gallantry in action during the war with Spain. Over the years he rose through the ranks, and in July 1917 went overseas with the AEF as commanding officer of the 7th Field Artillery. The year previous he had served briefly with the Signal Corps, and had qualified as a pilot, taking the "get rich quick" training course at San Diego. In Europe, he spent considerable time with the Royal Flying Corps, and thus gained a grasp of the problems of military aviation.

As head of the Division of Military Aeronautics, he faced the inevitable difficulties of coordination arising from the fact that aircraft production matters were

under a separate bureau. August 28, 1918, Mr. Ryan was named Second Assistant Secretary of War and Director of Air Service. As such, he was to have supervision, control and direction over both Kenly's division and the production bureau. Soon after, Ryan went to Europe; he had hardly returned before the war was over. Forthwith, he resigned without having taken over actual direction of military aviation.

1919-1921

THE man who next became Director of the Air Service, being appointed December 23, 1918, was Maj. Gen. Charles T. Menoher. Two years older than Gen. Kenly, he also was an Academy graduate, class of '86, and an Artillery careerist. He served with distinction overseas, commanding first the 5th Field Artillery and then the famed Rainbow (42d) Division from December 1917 until the Armistice. No one questioned the general's bravery, or his competence as a leader of ground troops.

But there was little enthusiasm about Menoher's assignment as head of the Air Service among the officers of the Air Service itself, especially those returning from overseas where they had helped to bring into lusty adolescence a new air arm. They continued to have doubts when the Army Reorganization Act of 1920 cut the Air Service personnel to 1,514 officers and 16,000 enlisted personnel—hardly more than at the beginning of the war. They were not surprised and certainly not pleased, somewhat earlier, when his Menoher Board (comprising, in addition to himself, four other Artillery officers) held against creation of a separate department of air. Menoher personally regarded the Air Service as no more than an auxiliary unit, and at that not a decisive one. He knew where wars were won—on the ground.

MAJ. GEN. CHARLES T. MENOHER

For his Assistant Chief of Air Service —no choice of his—Gen. Menoher was given the man who, regardless of title, in the mind of the public had run the Air Service in France, Brig. Gen. William Mitchell. While Menoher was patiently explaining the subordinate, proper role of the airplane, the intrepid Mitchell was running around the country, making all kinds of speeches about air power.

What was worse—from the standpoint of getting along with old Navy and Army friends—he was proving his air power thesis by sinking supposedly impregnable battleships with his aerial bombs.

Gen. Menoher in the summer of 1921 requested that Mitchell be relieved as Assistant Chief. When the request was denied, the Chief of the Air Service fumed and finally asked to be relieved of his command.

1921-1927

APPOINTMENT of Maj. Gen. Mason M. Patrick as Chief of Air Service on October 5, 1921 was not the first time he was called upon by Gen. "Blackjack" Pershing to take over a hot-spot job. In the spring of 1918, he was named Chief of Air Service of the AEF, when there had been a clash between Billy Mitchell and Bennie Foulois. Now, he

MAJ. GEN. MASON M. PATRICK

was picked to wield the firm control of a senior military officer and to restore order in a situation that appeared to be getting out of hand.

To muzzle Mitchell was impossible, but it can be fairly said Gen. Patrick delayed for years the explosion that led to the 1925 court-martial.

Gen. Patrick was graduated from the Military Academy in 1886, in the same class as Pershing, and until his first assignment to the Air Service served with the Corps of Engineers. In France he commanded the 1st Engineers, was in charge of Engineer Instruction, AEF, and then was Director of Construction and Forestry, from August 1917 to May 1918.

Although it was not until after he had become Chief of Air Service that Gen. Patrick soloed, the officers of the Air Service recognized in him an experienced friend of military aviation. They knew him to be tough and crusty. They knew him to be fair.

Respecting the role of military aviation and how it should be played, Gen. Patrick showed himself to be a moderate. In testimony before the Lampert Committee of the House on January 5, 1925, he pointed out he had recommended the War Department seek legislation "for the reorganization of the Air Service as an air corps apart from the War Department, but under the Secretary of War." This, he conceded, "is a step in that direction (establishment of an absolutely independent air service) and a rather long one, but of course does not go all the way." He felt "the ultimate solution" was concentration of responsibility for defense "on one head," but "the time for that is not quite ripe."

Firmly, wisely, he walked the middle path. Forced to use obsolete airplanes left over from the war, and in the face of promotion policies that penalized air officers, he managed to hold the nucleus of talented young men who, 15 years later, were to lead our aviation force to victory in World War II.

July 2, 1926, the Air Service became the Air Corps. The same legislation authorized a five-year program of expansion, and provided an Assistant Secretary of War to foster military aviation, which remained under firm control of the War Department. Gains had been made but they were small.

1927-1931

GEN. PATRICK retired December 12, 1927, and was succeeded as Chief of the Army Air Corps by Maj. Gen. James E. Fechet, who had been Assistant Chief since the spring of 1925. With the appointment of Fechet, precedent was broken two ways. He was not a graduate of West Point. For 10 years his career had been in military aviation.

After studying mechanical engineering for three years at the University of Nebraska, Fechet, not yet 21, enlisted in the Cavalry and served in Cuba during the war with Spain. In 1901, having been commissioned a 2d lieutenant, he went to the Philippines for duty against the Insurgents. An accomplished horseman, in 1909 he rode with the Cavalry Team. In 1916 he campaigned in the

MAJ. GEN. JAMES E. FECHET

Punitive Expedition into Mexico. Beginning in 1917 he commanded Signal Corps aviation schools at Belleville, Ill., and Arcadia, Fla. In 1918, he commanded Kelly Field, and in 1924 he headed the Advanced Flying School at Kelly. He knew the importance of adequate flight training. He insisted upon high standards of pilot proficiency. He was the first chief to be as competent in the air as he demanded of others.

The problems faced by Gen. Fechet during his service as Chief of Air Corps were similar in many ways to those that plagued his predecessor. World War I equipment, long since obsolete, proved to be remarkably long-lived; it was not until July 1, 1929 that the Liberty engine was ruled out as the power plant when new airplanes were to be ordered. The five-year plan of 1926 notwithstanding, insufficient funds year after year made impossible maintenance of authorized strength either in airplanes or personnel. War Department promotion policies continued to penalize officers in the Air Corps.

And yet, despite all obstacles and handicaps, progress continued. Perhaps the project closest to Gen. Fechet's heart was Randolph Field, the "West Point of the Air." Completed at a cost of $10,000,000 in the waning days of his tenure, the pilot-training installation was hailed as "not only the largest airdrome in the world . . . but also the first 'air city' as well." As first constructed, it was geared to accommodate 500 cadets and provide flight training of the kind Fechet supported so passionately.

1931-1935

MAJ. GEN. BENJAMIN D. FOULOIS took over as Chief of Air Corps December 19, 1931. He brought with him a military record that included a number of aviation accomplishments that could never be duplicated. More important, his record was full of evidence that the man had spunk and courage.

Bennie Foulois enlisted in the Army Engineers in 1898, and he saw service in Cuba. In 1908, he was detailed to the Office of the Chief Signal Officer. That year, having been commissioned in 1906, he was given operating charge of the first

MAJ. GEN. BENJAMIN D. FOULOIS

dirigible airship bought by the Army. In 1909 he rode with Orville Wright on the final acceptance flight of the Wright Flyer. He was given flight instruction at College Park, but had not yet soloed when in 1910 he was ordered to take the Army's first and only airplane to San Antonio. In 1915-16, he commanded the 1st Aero Squadron which participated—not spectacularly—in the Mexican punitive action. During World War I, he was successively Chief of the Air Service, AEF, and of the Air Service, 1st Army, and Assistant Chief of Air Service, Zone of Advance, and Air Service, Services of Supply.

Testifying before the Menoher Board in 1919, he invited court-martial when he said, "I can frankly state that, in my opinion, the War Department has earned no right or title to claim future control over aviation or the aircraft industries of the United States." If what he said was to be construed as insubordination, then Foulois was ready to take his chances of punishment "in a cause which, in my opinion, will develop and go ahead in spite of every effort to impede its progress." During Foulois' tenure as Chief, military aviation continued a contender as the most investigated activity ever carried on by the US government. In 1934 the Baker board (headed by the former Secretary of War) became the fifteenth body since the war to have studied the advisability of creating a department of air, or a department of national defense. The most important recommendation of the Baker board was for creation of a General Headquarters Air Force that would be capable of operating either in close cooperation with the ground forces or independently. The GHQ Air Force was established March 1, 1935. It was subject only to the Army General Staff; supply and training remained under the control of the Chief of Air Corps. Within the Corps, there was mild optimism that despite the difficulties of coordination, the action might prove the best so far to build up a proper air defense.

1935-1938

MAJ. GEN. OSCAR WESTOVER, a graduate of West Point in 1906, served 10 years in the Infantry before transferring to the Signal Corps. He was a rated pilot in both airships (in 1922 he won the national elimination free balloon race) and airplanes. In the 20's, although now past 40, he continued to sharpen his pilot proficiency by attending the tactical and flight attack schools.

MAJ. GEN. OSCAR WESTOVER

Throughout his career Oscar Westover drove himself unceasingly. In 1933 it was he who prepared the plan for aerial defense that two years later resulted in formation of the GHQ Air Force. There was irony in this development. On December 22, 1935, he took over as Chief of the Air Corps. One of his first actions was to urge, unsuccessfully, that in order to achieve unity of control, Brig. Gen. Frank M. Andrews and the GHQ Air Force should be placed under the Chief of Air Corps.

Gen. Westover was plain-spoken. With the clouds of war darkening ominously,

he saw American defense plans endangered by continued agitation for military aviation to be broken free from the Army. "Any measures to create a separate Air Department of the Government, or even a separate setup of aviation within the War Department, would at this time be a step backward," he told the Air Defense League in 1937. It is to be doubted whether Westover's opinion was enthusiastically accepted by other Air Corps officers; there is no doubt his views were respected. During 1937 and 1938, he seemed to be stepping up the pace of his already racing routine. Always piloting his own plane, he flew from one end of the country to the other. He visited Air Corps installations to assure himself that, within the skimpy appropriations available, our air defenses were being made ready. With equal frequency, he spoke publicly about the importance of air power.

On September 21, 1938, accompanied only by his crew chief, he came in for a landing alongside the Lockheed plant at Burbank, Calif. Something went wrong, and the plane crashed in flames, killing Gen. Westover and his passenger.

1938-1946

GENERAL of the Air Force Henry H. Arnold learned to fly in 1911 at the school operated by the Wright brothers. Over the next 40 years he lived and breathed and fought for the development of military aviation in the US. During the Mitchell court-martial in 1925, "Hap" Arnold fought, often openly, in defense of his idol and his ideas. After the trial he was exiled to Fort Riley, Kan., but he came back.

Twice he won the Mackay Trophy. In 1912, it was for a cross-country flight from College Park, Md. In 1934, it was for leading a flight of bombers from Washington to Alaska and return.

As Hap Arnold grew older, he concentrated on education or, as he preferred to say, "indoctrination" of the air power concept. Such tactics were less spectacular than frontal assaults upon entrenched thinking; they were more successful. George Marshall and Harry Hopkins were two who were indoctrinated. In 1939, by now Chief of the Air Corps, Arnold testified, "With the expansion that is confronting the Air Corps now I would dislike very much for us to be thrown out on our own without any of the help and assistance we can get right now from the rest of the War Department." Seldom, at least outwardly, did he worry about the question Billy Mitchell had eternally asked—"Who the hell is going to run this thing anyway, and why?"

Instead, with remarkable clarity he recognized and stated the elements necessary to attainment of supremacy in the air. His classic definition: "Airpower includes a nation's ability to deliver cargo, people, destructive missiles and war-making potential through the air to a desired destination to accomplish a desired purpose. Airpower is not composed alone of the war-making components of aviation. It is the total aviation activity—civilian and military, commercial and private, potential as well as existing."

Perhaps the best summation of the role

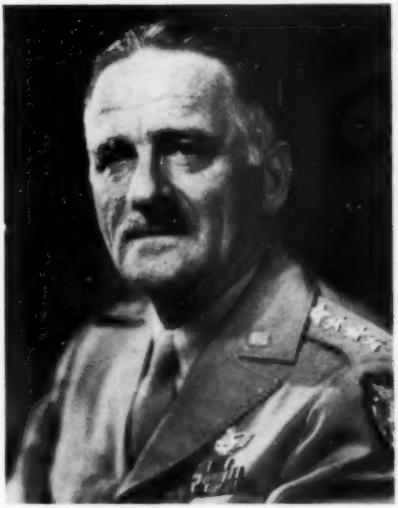
GEN. HENRY H. ARNOLD

Gen. Arnold played in World War II is contained in the citation of the second Oak Leaf Cluster to his Distinguished Service Medal: "From concept to execution, Gen. Arnold's leadership guided the mightiest air force in history. No single factor of the great Allied victories was more vital than the destruction of the capacity of Germany and Japan to wage modern technological warfare. The long-range precision attacks of massed air power which accomplished this objective were the products of his genius. At the same time, Gen. Arnold directed the training and equipment of the US Tactical Air Force, so that when the great decisive three-dimensional battles of World War II were joined, his fighters and attack bombers were ready to sweep the skies of the enemy and deny him mobility on the surface. During the growth of the Air Army, Gen. Arnold constantly increased the effectiveness of its activities by imaginative conceptions concerning the application of air power to strategy and tactics and by the development of potent new weapons. . . ."

1946-1948

WITHIN two years of West Point and his 2d lieutenant's commission in the Infantry, Carl Spaatz learned to fly at the San Diego school of the Signal Corps and was serving in the 1st Aero Squadron on the Mexican border. The next year, 1917, he was overseas with the AEF, a training officer at the famed Air Service School at Issoudun. Later, in 1918, he was a pursuit pilot in the 2d Pursuit Group, and was credited with downing three Fokkers.

Always a doer, in peace as in war, "Tooey" Spaatz was a pilot's pilot. He commanded fighter groups; he commanded bomber groups. Endlessly, he studied tactics and schooled his pilots to perfection. In 1929, he commanded the *Question Mark* on a 150-hour nonstop, refueling record flight. The crude method he used to refuel spelled out possibilities that could be achieved in tactical use.



GEN. CARL SPAATZ

By 1940, Spaatz was Chief of Plans and then Chief of the Air Staff of the Air Corps. That year, he was in England during the Battle of Britain. Soon after Pearl Harbor, he headed the 8th Air Force and moved his command to the European Theater of Operations to prepare for the American bombing of Germany. In July, he was appointed Commanding General of the US Army Air Forces in the European Theater.

Throughout the war, he directed the hammer blows struck by increasingly potent assemblages of aircraft. He headed the 12th Air Force in North Africa and then the Northwest African Air Force. After Rommel's Afrika Korps had been driven out of North Africa, he became Deputy Commander of the Mediterranean Allied Air Forces, and then in 1944 returned to England to command the US Strategic Air Forces in Europe throughout the campaign that led to victory.

Following V-E day, he flew West to assume command of the US Strategic Air Forces in the Pacific, with headquarters on Guam. There he supervised the final strategic bombing of Japan by the B-29,

including the two atomic bomb missions. He had earned the right to be present at all three signings of unconditional surrender, at Rheims, at Berlin and at Tokyo.

In February 1946, Gen. Spaatz was nominated to succeed another great air general as Commander of the Army Air Forces. In September 1947 he was chosen the first Chief of Staff of the new US Air Force.

1948-1953

HOYT S. VANDENBERG had the will and the capacity to command from his earliest days. Rigorously, patiently, he fitted himself for the jobs to be done. In 1923, graduated from West Point, he chose the Air Service at a time when advancement was sure to be slow. He knew what he wanted, to play a part in future dramas of the air.

In the peacetime years, he attended every school he could manage . . . Air Corps Tactical, Command and General Staff, Army War College. In between, he taught others what he had learned.

GEN. HOYT S. VANDENBERG

In 1939, still a major he worked in the Plans Division of the Office of the Chief of the Air Corps. After Pearl Harbor, by now a colonel, he was Operations and Training Officer of the Air Staff. What he did, he did surpassingly well.

Beginning in June 1942, Vandenberg was Chief of Staff to Spaatz in the 12th Air Force and later in the Northwest African Strategic Air Force. In this latter assignment he often led his bombers on their missions deep into enemy territory. In '43, he was Deputy Chief of the Air Staff and then head of an air mission to Russia. In 1944, he was Deputy Air Commander-in-Chief of the Allied Expeditionary Forces, and Commander of the American Air Component and of the 9th Air Force. In 1945, he was Assistant Chief of Air Staff at AAF Headquarters. In '47, he became Deputy Commander and Chief of the Air Staff. On October 1, 1947, he was named Vice Chief of Staff of the Air Force, and April 30, 1948, became Chief of Staff.

Gen. Vandenberg's last campaign as an Air Force officer was fought on the ground. It was a fierce, relentless battle. The stakes were high—the long-range strategic bombers the Air Force knew it needed to deter enemy aggression. The campaign was won, but the general's health was ravaged. April 2, 1954, less than a year after he had relinquished the post of Air Force Chief of Staff, Gen. Vandenberg was dead.

1953-1957

NATHAN F. TWINING'S military career began as an enlisted man in the Oregon National Guard in 1916. The following year he was called up for active duty in the National Guard, and later in '17, he entered West Point. Commissioned a 2d lieutenant in 1918, he served in the Infantry until 1923 when he entered Primary Flying School at Brooks Field.

From 1924 to July 1943, he had varied assignments—engineering officer for the Central Zone, adjutant of the 3d

GEN. NATHAN F. TWINING

Attack Group, assistant operations officer of the 3d Wing, technical supervisor at San Antonio Air Depot, assistant chief of the Inspection Division, in the office of the Chief of the Air Corps, chief of the technical inspection section of that office, assistant executive in the office of the Chief of Staff at Air Corps Headquarters, director of war organization and movements in that office . . . undramatic jobs heavy with detail . . . important jobs . . . important training for a man with Twining's destiny.

In the summer of 1942, Gen. Twining was Chief of Staff of the Allied Air Forces in the South Pacific. In 1943, he was Commanding General of the 13th Air Force, and in July of that year, Commander, Aircraft, Solomon Islands, with tactical control of all Army, Navy, Marine and Allied air forces in the South Pacific. In November 1943, he took command of the 15th Air Force in Italy, and in January, command also of the Mediterranean Allied Strategic Air Forces. In July 1945, he assumed command of the 20th Air Force.

For two peacetime years he headed the Air Materiel Command at Wright Field, and then from October of 1947 until July of 1950 he was Commander-in-Chief of the Alaskan Command. Thence he was Vice Chief of Staff of the Air Force until 1953.

Gen. Twining's more than 30 years service stood him in good stead during 1953-57 when he was Air Force Chief of Staff in a time of "normalcy" and budget cutting. It will serve him well in his new job—the first Air Force officer to be Chairman of the Joint Chiefs.

1957-

GENERAL THOMAS DRESSER WHITE became Chief of Staff of the US Air Force on July 1, 1957, after having served four years as Vice Chief under Gen. Nathan F. Twining.

Born in Walker, Minn., August 6, 1901, he was graduated from West Point July 2, 1920. Commissioned a 2d lieutenant in the Infantry, he was promoted forthwith to 1st lieutenant. After attendance at the Infantry School at Fort Benning, Ga., and duty with the 14th

GEN. THOMAS D. WHITE

Infantry in the Canal Zone, he entered the Primary Flying School at Brooks Field in 1924. After further instruction at the Advanced Flying School at Kelly Field, he was attached the following year to the 99th Observation Squadron at Bolling Field.

In 1927 he was sent to Peking to study the Chinese language and in 1931 was given duty at Air Force Headquarters in Washington. Beginning in 1934, for two years he was assistant military attaché for air in Russia, Italy and Greece. Then came further schooling at the Air Corps Tactical School and the Command and General Staff School. In 1940, he began two years' service in Brazil, first as military attaché and then as Chief of the US Military Air Mission.

Returning to the US in March 1942, he was appointed Assistant Chief of Staff for Operations of the 3d Air Force and later, Chief of Staff. In 1944 he was reassigned to AF Headquarters and became Assistant Chief of Staff for Intelligence.

In September 1944 he became Deputy Commander of the 13th Air Force, taking part in the New Guinea, Philippine, and Borneo campaigns. In June 1945 he assumed command of the 7th Air Force in the Marianas and moved with it to Okinawa. In October 1946 he became Chief of Staff of the Pacific Air Command in Tokyo and in '47 took command of the 5th Air Force in Japan.

Transferred to the Office of the Secretary of the Air Force, Gen. White became Director of Legislation and Liaison in October 1948. He was appointed Air Force member of the Joint Strategic Survey Committee in the Office of the Joint Chiefs of Staff in May 1950, and in 1951 became Deputy Chief of Staff, Operations.

Thus, to the office of the Air Force Chief of Staff, Gen. White brings—in addition to the requisite qualities of high leadership forged in battle and tempered in the highest echelons of Washington—subtle talents developed and proved in foreign capitals . . . Peking, Moscow, Tokyo, Rome, Rio de Janeiro. . . .

Military aviation — an instrument of diplomacy no less than a weapon of war —how powerful it has become in its first half century.

* * *

Here the free spirit of mankind, at length,

Throws its last fetters off; and who shall place

A limit to the giant's unchained strength,

Or curb his swiftness in the forward race?

William Cullen Bryant

THE BATTLE FOR MEN'S MINDS

By DR. THOMAS F. STATON
Educational Adviser
Command and Staff College, Air University

PART TWO

Synopsis of Part One: Communism is currently waging all-out war against the free world, its object being to bring peoples under its sway by achieving control of their minds and thinking rather than by military conquest. The Nazis pioneered this technique, achieving with it remarkable success in controlling the people of Germany and demoralizing their opponents. They used a three-step technique in doing this: (1) establish a hate-fear object (Jews and World War I Allies, in the case of the Nazis); (2) offer a plan and agency for overcoming the hate-fear object (the Nazi party); and, (3) eliminate all information which would undeceive the target population. The communists use basically the same technique, with the "haves" of the world as the hate-fear object, and the Communist Party as the savior. Communists view the battle for men's minds as a guerrilla war, undeclared, bound by no ethics or limitations, and using any means which promises furtherance of their ends. Communist tactics center on efforts in three major areas of action:

1. *Maintain that your government is perfect, and that the system of your opponent is vicious and evil. You are all good—he is all bad!*
2. *Use any and all means to attain your ends.*
3. *Foment hatred and internal strife among the target people, particularly slander; and defame anyone opposing your activities.*

Part Two treats with a possible democratic response to the communist challenge in this battle for men's minds.

Democratic Weapons in the Battle for Men's Minds

SINCE mores of the democracies prohibit thought control, hate mongering, lies, irresponsible agitation, promises of wealth and power, opportunism, and violations of national integrity, what weapons remain to them in the battle for men's minds? The idealist's answer to this is, "The weapons of love and friendship." This is a possible approach, but its value is perhaps demonstrated by an examination of how well it has worked in China, Indo-China, India, and the Mediterranean countries. The unpleasant fact is that, although mother-love will call forth sacrifice even unto death, the sort of love that can be developed between the peoples of two nations will seldom, if ever, be strong enough to cause one of the nations to risk annihilation because of its bond of affection with another. I may be fond of you, but if a loaded pistol is pointed at my head and I am told to accompany the holder of the pistol and abandon you now and

henceforward, in most cases you will be abandoned. In short, self-preservation is usually the most powerful of all national feelings.

If this is true, it means that a people will, by and large, choose to ally themselves with the power offering them greatest overall security. In an educated and highly civilized people this "overall security" is probably long-term "eventual" security. In a more elemental people, whose problems are on a day-to-day existence level, the most immediate and elemental security is likely to be chosen, regardless of long-term considerations. Thus we see the democracies holding firm in areas such as Norway and Holland, but succeeding less well among peoples less highly literate and more easily swayed by simple emotional appeals. There are exceptions, but as a rule of thumb, the generalization appears substantially correct. The question then arises, "What appeal can be made to the populations not susceptible to the appeal of long-range social, political, and economic betterment?" Their unsusceptibility to this appeal may be either from fear of a neighboring military power or some overwhelming preoccupation with immediate problems of existence. In any event, how can the democracies reach them? Let us consider the possibilities of democratic tactics in this battle for men's minds along three lines:

1. Emphasis on our own power and ultimate triumph.
2. Emphasis on the freedom and justice for which we stand.
3. Truthful and dramatic representation of the persecution, misery, and enslavement suffered by all peoples under communist domination.

Emphasis on our own power: This has been decried by some idealists, many "liberals," and *all* communists and communistic sympathizers as "sword-rattling." It is sword-rattling! So long as the sword-rattling is truthful, is not used for intimidation, and emphasizes the power of free peoples to deter aggression and enslavement, there is nothing wrong with it. The idealists and liberals who object to publicizing our strength, do not realize that most of the people being competed for by the democracies and communists are much more susceptible to the appeal of protection and ultimate victory than the appeal to an abstract principle of government, or even freedom. The communists and communistic sympathizers know this full well. Therefore, they agitate against any educational campaign designed to inform peoples of the world of the overwhelming strength and capacity for ultimate victory of the democracies. They capitalize on the ethical qualms of the honest idealists and liberals, and use these innocents as cat's-paws, encouraging them to serve as "fronts" of agitation against our capitalizing on the convincing argument of our power.

The communists themselves play power politics to the last degree while, of course, claiming that they do not, and that we do. Massing of troops along borders is power politics. It is power politics to order organized minorities to threaten a government with revolution if communist demands are not met.

We have traditionally regarded these implements of power politics as being against our ethical concepts. About the only power politics the democracies may employ, under our present concept of ethics, is stressing our decisive *world air power*. Viewed in the light of its purpose in this country, strategic air power is a weapon to deter aggression and maintain the peace. Every corner of the earth should be saturated with information by radio, by pamphlet, by moving pictures, and by word of mouth, of every person friendly to freedom and democracy, emphasizing that the United States has the power to crush the forces of communism at their source—Soviet Russia. This information should always carry one theme: the United States stands only for freedom, prosperity, and justice for all peoples throughout the world. If the forces of oppression and enslavement step out of bounds, they can and will be destroyed. This power has never been

used, and will never be used to enslave or oppress; it will be used, if necessary, to save peoples from enslavement and oppression. The democracies mean ultimate peace, prosperity, freedom, and justice, and have the power to crush the forces of oppression, enslavement, and persecution which are communism. This power will not be used except to protect freedom against enslavement, but it will be successful if we are forced to use it. This theme—the power and willingness through air power to protect against enslavement and destroy aggression—should be repeated in different words, but with the same meaning, until it becomes completely imbedded in the minds and feelings of peoples throughout the world.

We learned long ago that lies, repeated often enough and strongly enough, come to be accepted and acted upon as truth. What we have neglected is the fact that truth, repeated often enough and strongly enough, can be as convincing as lies, and can be successful in the battle against lies. The democracies have never made a serious, all-out effort to carry the message of their power and their willingness to use that power to defeat oppression. They have timidly touched the outskirts with carefully "nonprovocative" radio broadcasts, but they have never really entered the battle for men's minds as an all-out, survive-or-die affair. For primitive peoples the concept of iron birds who can drop thousands of objects, each of which can destroy whole villages and sear the very earth for miles around, can be fully as effective as any power promise communists can make. It will, if properly preached, persuade more peoples to ally themselves with democracy than will any amount of emphasis on the joys of freedom and democracy. The joys and freedoms are appreciated—they are the ultimate prize to be won; but few peoples will try for such prizes unless convinced that there is a power which can protect them from death and enslavement by those who would keep them from the prize. In other words, the promise of a reward must be accompanied by the conviction that the reward can be won in spite of all opposition.

The communists have preached convincingly that they have the power to insure winning the prize. Apparently most Indo-Chinese have been convinced of it; most Chinese have—many Africans have. We have never capitalized upon our own power possibilities through air power. It is time to ignore those fatuous innocents who hysterically shriek that it is evil to indoctrinate the world on the power that possession of thermo-nuclear weapons and decisive air power gives us. Similarly, the sensibility of our abandoning tests of thermo-nuclear weapons can best be evaluated by asking who is the chief source of demands to abandon thermo-nuclear weapons and their testing? The answer is—the Soviet Union and communist agents throughout the world. In protesting our exploitation of air power, nearsighted idealists who are unwilling to recognize the horrible reality of a nation dedicated to the destruction of man's freedom throughout the world, have played into the hands of agents of Communism. We see the depressing spectacle of some of the noblest and best people of the United States and of the world, through ignorance and through unwillingness to accept facts, ("None are so blind as those who will not see") being unwitting tools of the Soviet Union and the Communist Party. Egged on by clever communist propaganda these idealists, wise in philosophy but ignorant of the realities of international relations, advocate in the name of freedom and peace a pacifistic attitude which would enable the enemies of freedom and peace to destroy us.

If the United States succumbs to this pressure from our own idealists and enemy agents, the world will be lost. The manpower of the Soviets would give them unquestioned victory. Our only source of power in effective quantities is our atomic weapons and the air power to deliver them wherever needed. We must not abandon our ethics and moral principles. On the other hand, we must not

become such dupes as to accept the Communist Party line that it would be inhuman to eradicate city "A" by a thermo-nuclear weapon to prevent city "A" eradicating city "B" with the bayonet, the knout, and the high explosive shell. The contention that it is improper for city "B" to protect itself from old-fashioned annihilation through the employment of new weapons is the basis of the agitation of communists that it is unethical for us to capitalize on the power thermo-nuclear weapons gives us. Many of our own half-thinkers have fallen into the trap. Even those who have not fallen into the trap have not established an all-out, world-wide educational program as to the certainty of victory that strategic air power gives us, and we are still losing the battle for men's minds. Most peoples of the world will line up on the side offering them best chance of victory. We must convince them that we are that side, and emphasis on the supremacy of our air power is our chief means of doing this.

Fear, in the form of a wholesome respect for our dislike of those who aid and embrace our enemies, is an ethical weapon for our use in this battle for men's minds, too. In the Nuremberg trials of "war criminals" we took the position that enemies who violated our own standards of ethics could be punished when fate placed them within our power. There is no moral reason why we should not re-enforce our public education campaign to a people with the vigorous, unequivocal assurance that when the forces of freedom and democracy have triumphed in that nation, the agents and tools of communistic enslavement will be ferreted out and punished. There is nothing in the intrinsic tenets of democracy that renders it unethical plainly to threaten punishment to those anywhere who ally themselves against us. For this is war, not choosing up sides for a ball game! And a fear of righteous retribution from the powers of freedom and justice for those who have attempted to destroy freedom and justice, can be a force which will make the irresponsible and self-seeking hesitate before becoming tools of communism!

Emphasis on freedom and justice for which we stand: The communists have deliberately associated the name of the United States and the sort of democracy for which we stand with all that is criminal, evil, despicable, and wrong to peoples throughout the world. They have simultaneously presented themselves as the champions of right and virtue. In this area we can do little better than emulate the example of the Soviets in talking about themselves. Their constant use of "peace-loving country" as referring to themselves—the constant use of such terms as "people's governments," "justice," and the whole galaxy of terms associated in men's minds with peace, freedom, and prosperity in referring to themselves, has been ridiculed by us. We have termed it infantile and transparent. The fact is, it is both profound and effective.

The human mind uses words to do its thinking. It tends to use words in the context in which it is familiar with them. The mere procedure of familiarizing men throughout the world with words, such as "peace-loving," "prosperous," "happy," "justice," "enemy of oppression," and "rescuer," within the context of communist doctrine, tends to develop in men's minds an association between those qualities and the Communist Party. We have never completely comprehended the basic idealogical fact stated by Hitler that anything heard often enough tends gradually to be believed regardless of its ridiculousness. There is a bit of verse that has assumed the stature of a proverb:

"Vice is a monster of so horrid a mien
That to be hated has but to be seen,
But seen too oft, familiar with its face,
We first endure, then pity, then embrace."

Substitute the world "lie" and the proverb is equally sound. Substitute the words "unpleasant truth" and the poetry will no longer scan, but will still be true. Truth, if repeated often enough, comes to be embraced. The democracies should take

steps to associate their names in written and oral statements with such terms as "peace-loving," "justice," and "plenty to eat," for the consumption of other peoples.

Most of the people whom we are seeking to win to the cause of freedom know only what they hear and, to a much lesser extent, what they read about communism and democracy. This being the case, the side which is most successful in identifying itself with words of popular appeal, such as "plenty to eat," "freedom from oppression," and so on, is likely to make people most sympathetic to it.

This sympathy will not, by itself, counterbalance the respect for power discussed earlier. It is a supplement to this technique. It is an important supplement, however, because to avoid the accusation that we are warmongering when we preach the decisive effect of air power, we should take occasion to sprinkle our sentences and paragraphs liberally with references to air power and thermo-nuclear weapons as "peace power," "atomic weapons of defense against aggression," "the power of destruction which holds the forces of enslavement at bay," and "the power of peace-loving peoples which prevents war."

The Air Force has made one simple step in the use of this technique in the battle for men's minds in the phrase, "Air power is peace power." Air power is the chief defense of the free world. Therefore, communist propaganda is concentrated in attacking this power. Land and sea forces undergo little attack by communist propagandists. Air power is decisive! Air power is the one medium by which the Soviet can be defeated. Therefore, air power is the chief target of communist antimilitary propaganda. In their battle for men's minds, then, air power in all its forms and uses should be eulogized by the democracies. Its decisive power should be universally impressed on the minds of men, and it should in all instances, be represented as the chief terror and deterrent of enslavement and aggression.

What is needed is the assignment of a dozen, a score, or perhaps a hundred capable writers to produce educational pictures, literature, and conversational gambits for peoples of the world in which the concept of air and thermo-nuclear power of the United States is indistinguishably merged with the concept of prosperity, peace, and freedom for all people who will take refuge under the umbrella of this power.

It is blind and childish of us to deny the testimony of the history of the last eight years; namely, that such associations of words *do* influence the attitudes men form toward the objectives of the words. The effectiveness of brain washing depends to a great extent on fatigue and despair. However, every person who has undergone the experience and returned to freedom has testified convincingly that it depends also on the endless repetition of "good" words in reference to Communism and "bad" words in relation to the democracies. This association of words has been a pattern, equal in many respects and decisive in some respects with other brain-washing techniques, in producing the mind and attitude that the Communists undertook to manufacture. If we want to win the battle for men's minds we had better undertake to find a scheme by which our political and economic systems, our institutions, and our air power are drummed into the ears and minds of peoples throughout the world so constantly and in such inseparable relationship to words, such as "food," "plenty," "justice," "life," "liberty," and "happiness" that the United States and all it advocates becomes synonymous with these qualities in the minds of the people. This will prevent people's regarding our publicizing our air power as imperialistic and dangerous. People simply do not think of things as imperialistic and dangerous when their minds are completely saturated with the concept that these things are good and beneficial.

Truthful and dramatic representation of the persecution, misery, and enslave-

ment suffered by all peoples under Communist domination: There seems no possible ethical objection to doing this. It is true that some libel laws say, "The greater the truth the greater the libel." It is difficult to see, however, how anyone of intelligence and perception can find moral objection to informing peoples of the world of the fate they will suffer if they heed the seduction of Communism. It would not be unchristian or in any way immoral or unethical to launch an all-out campaign for men's minds throughout the world, telling them some of the bloodcurdling stories of things that have happened and are happening to people under the Communist regime.

In this connection the terms "evil," "imperialistic," "cruel," "bloodthirsty," etc. can, with honesty and propriety, be used whenever communism is referred to. Tell the stories of the torture of patriots that inevitably takes place when the Communist Party achieves power in an area. Name the men by name and tell in its full, horrible detail, of the tortures to which they were subjected. Name cities whose populations innocently aroused the suspicion of their own government and were, therefore, exterminated by massacre and deportation. Describe how children are shut in box cars for days on end in freezing weather in the process of deportation—little children six and twelve years old who are beaten, starved, and frozen for the crime of belonging to a parent disliked by communists. Tell how once in the toils of communism all national independence and sovereignty is lost, and tell the detailed stories of Czechoslovakia, Poland, and Hungary. Bombard the peoples of the world with this information. Describe to them how children under communism are taught to spy on their parents and turn them over to the government for torture and execution for a real or imagined act or thought. Remind them how a child, too young to know the implication of what he is doing, can "tell on" a parent out of pure temporary childish spite at being corrected. Explain the disastrous results that can come from this under the Communist system.

None of this is dirty fighting. None of it is unethical. It is simply showing people the face behind the mask which communism has represented to them in its propaganda.

Even if this is done, and done thoroughly, people will still accept communism when things come to a crisis unless education on our strength, our power to crush from the air any human agency on earth, is performed successfully. Reviling an opponent, showing him to be a monster, and showing one's self to be a savior will not win the battle for men's minds, if the monster has the power to destroy and the savior does not have the power to save. People will join the monster, risking the future to avoid immediate destruction. Appealing to men's hopes and fears will be effective only to the extent that the realization of the hopes and protection against things feared can be provided. Air power is the means which the democracies have of demonstrating this power. Tell the world of it. Tell the people of the Congo, of India, of Malaya, of every village of the Americas, the story of communist oppression and American power for peace and prosperity. Immunize them against the poisons of communism by saturating their minds and feelings with a loathing of all it really stands for, and the realization that it can be conquered by American planes and weapons. This battle for men's minds is a battle to the death. Many weapons we will not permit ourselves to use. Le us use those we can ethically employ vigorously, unreservedly, and unequivocally.

Accomplishing the Mission

How are these techniques to be carried out? How are we to reach the eyes and minds of peoples throughout the world? First, we can launch a full-scale program on our home front to build and sustain a national will to wage an all-out battle for men's minds throughout the world. We can quit shilly-shallying around as if this were only a game;

silence those in our ranks who would speak to the damage of our cause; and cheer and support those whose words and writings unequivocally oppose everything bearing an idealogical resemblance to the tenets of communism.

For the rest of the world we can use some of the techniques the communists employ. We have less to offer agents in ultimate power and position, but we can subsidize any competent journalist or agency who is willing to publish a periodical favorable to us and antagonistic to communism in any nation. We can subsidize them to whatever extent necessary to insure their protection and success. We can subsidize native traders, and trading companies, to sell admiration of democracy and distrust of communism by stories and pictures with every item sold a native. We can subsidize visits of foreign delegations to this country and give them intensive education on the military power of the United States, and on the fate of nations accepting communism.

We can produce for export regular, commercial-type motion pictures with high entertainment and smashing, elemental emotional appeal. Identify all admirable persons and elements of the picture with Americanism; all evil, degrading and unpleasant elements with Communism and Sovietism. Don't be afraid of being obvious. Furnish such movies free, in quantities, for showing in theaters of all countries throughout the world. Let them be shown in native dialect everywhere. Subsidize theaters which show them. In these pictures, in illustrated fiction magazines, in religious pamphlets, and "men only" magazines, portray the blessings of American democracy and the horror and depravity of communists and communism.

We can offer people outside our own country, as prizes to be gained through supporting democracy, things that are of greatest importance to THEM. The Four Freedoms, so well-known and important to us, are as incomprehensible to most peoples whose minds we seek to capture, as flying saucers are to us. In tailoring the copy to be used by our agents, the inducements, the advantages, the appeals of democracy, we should emphasize the full stomach, medical care for all, land (which we can promise will be theirs by just and equitable means of readjustment), freedom from arbitrary and unjust arrest, freedom from the danger of predetermined trial if they are arrested or accused, and, of great importance, complete and unequivocal protection from vengeance of the communists. Send these promises forth on the tongues and pages of every person and publication reaching people being wooed by communism. Keep the appeals elemental. A plot of ground, where he can earn a living for his family without fear of bandit or people's police, is more important to the Chinese peasant than any ideology!

We can appeal to nationalism. Using the Philippine Islands, Hawaii, Cuba, and Puerto Rico as examples, we can show that those who cast their lot with the United States are not held in serfdom. We can tell them that all we do in countries under our protectorate is aimed at their eventual independence. We can contrast our establishment of independent peoples with communist establishment of satallites. We can show that nationalism can only be realized through alliance with the free nations of the world.

We can select, train, and "grubstake" thousands of young Americans, eager for adventures, as traders or explorers in faraway lands on the condition that they will sell America and interest themselves in local affairs. In addition to conducting their business, they should be working to achieve popular acceptance—be active in community affairs, and become identified with popular or influential local elements. They should be good-will ambassadors.

We should not be niggardly in our subsidies of all these peoples and institutions. The few millions it would cost to put an army of ten thousand such agents in critical places of the world, would be a drop in the bucket compared to other expenses. Such an army might win the battle for men's minds. It is now being lost!

Official Photograph, U. S. Army Air Corps

EQUIPPED FOR A HIGH-ALTITUDE FLIGHT

The pilot is clad in several suits of woolen underwear, his regulation army uniform, a knitted woolen garment, and a suit of leather heavily padded with down and feathers. Fur-lined gloves, fleece-lined moccasins over the boots, and goggles treated with an antifreeze gelatine complete the costume.

EXPLORING THE EARTH'S STRATOSPHERE

By JOHN A. MACREADY

During World War I, and for a limited time thereafter, the author of this paper was a lieutenant in the United States Army Air Corps. During his short tour of duty as an active military aviator he established a singular record as an exploratory pioneer.

Among his outstanding achievements he shared with his companion pilot, Lieutenant Oakley G. Kelly, a world flying endurance record and the first nonstop flight across the United States from coast to coast. With Captain Albert W. Stevens operating the camera, they set a world altitude record in aerial photography. Flying alone, he went a little farther out from the surface of the earth than man had ever gone before. He cut for himself a deep and enduring niche in the Aviators' Hall of Fame. Through the courtesy of The National Geographic Society it is our pleasure to reprint this narrative report of his ventures in probing the stratosphere.

For a sound recognition of his achievements the limitations imposed by the aircraft and instrumentation of that time must be fully understood. He consistently demonstrated a superior aptitude in getting peak performance in the aircraft that he flew. He molded an example in skill, courage, and determination that will be lasting.

BROWSING through the pages of an encyclopedia, I chanced upon an article entitled "Altitude Records," and being much concerned with this subject, I read the following paragraph with considerable interest:

"On April 15, 1875, M. Gaston Tissandier and two companions, MM. de Sive and Groce Spinelli, rose from Paris in the spherical balloon *Zenith* to a height of five and one-third miles (28,000 feet). M. Tissandier alone survived the trip, his companions dying in mid-air. He himself was rendered unconscious."

This was, perhaps, the first altitude flight of any magnitude ever made, and the fates of these gentlemen caused great speculation at the time regarding conditions in the extreme upper regions.

Many years were to elapse before flights to great heights were again attempted; then the advent of heavier-than-air craft and the exigencies of a great war made it increasingly apparent that higher and higher altitudes must be used, both because of the longer ranges being developed in anti-aircraft guns and because in individual combat, in the air as on the ground, it invariably proved to be the man on top who won the fight.

Fifty Flights to Altitudes of Nearly Six Miles

So, although the same exploring instinct which actuated M. Tissandier and his companions was firmly implanted in my own breast, the reasons for my recent high altitude flights were not primarily

to satisfy this instinct, nor to add to the store of the world's scientific knowledge, but to forward, through experiments, the development of a logical and necessary military program.

In prosecution of this development work, carried on by the Engineering Division of the Army Air Corps, I have made approximately fifty flights to altitudes above 30,000 feet and about ten flights to altitudes above 35,000 feet.

This high-altitude test work was begun in April, 1920. Up to that time Major R. W. Schroeder, in making an Air Service test, had gone farther into this unknown region of the sky than any other living creature. On the morning of February 27, 1920, he climbed into a Le Pere airplane which was equipped with oxygen flasks and a supercharger, an instrument used to supply sea-level pressure to the engine carburetor at high altitudes, and started on his long climb.

Falling from a Height of Six Miles

The oxygen equipment was supposed to supply the pilot with oxygen automatically as he needed it, but when he had fought his way upward through the frigid air for one hour and forty-seven minutes and had achieved an altitude of 33,000 feet, it suddenly failed to function.

Major Schroeder had an emergency flask, and he resorted to this upon discovering that his supply had stopped. Fearing that the emergency supply would become exhausted, he lifted his oil-grimed goggles so that he might see to make an adjustment in the automatic feed and, deprived entirely of oxygen in that instant of stooping forward, he lost consciousness and fell with his plane, like a plummet, through the thin air for six miles.

The presence of oxygen in the heavier air of the lower altitude, however, partially revived him, and instinctively he regained control of the plane. Miraculously, in his semi-conscious condition, he made a safe landing, his eyes full of ice and temporarily blinded by the extreme cold to which he had been exposed during his long fall—undoubtedly the longest fall of man since the famous exit of Satan from the gates of heaven.

There was a glory in this fall, however, absolutely lacking in that of his predecessor; for, although Major Schroeder spent several weeks in a hospital recuperating, he had brought down with him a new world's altitude record and valuable information upon general conditions at high altitudes and upon the behavior of plane and engine in them.

Winning the "Icicle Crown"

I was just beginning my work as a test pilot and little dreamed, as I helped lift the limp figure of the pilot from the plane to the waiting ambulance, that mine would be the shoulders upon which his cloak would later fall, or that I would one day receive from him a gay letter, requesting, "Mac, I wish that you would look over the place where I had my bad luck, and if it needs any attention polish it up a bit."

I now hold, as one of my most treasured possessions, his congratulations upon my winning from him "the icicle crown," as he put it, when I bettered his world's altitude record.

The "Ceiling" of the Airplane, not the Pilot's Endurance, Limits Altitude Flights

It is a strange region, this air high above us, which probably through pure choice few of us will ever enter, full of treachery and danger to man, putting forth obstacles at every stage to halt his upward progress.

The general impression is that the effects of cold and hardship upon the pilot are the chief obstacles to be overcome in altitude flights.

This is a misconception which in press reports has often caused a severe jolt to my pride, for never have I descended from an altitude test for lack of physical endurance or for any reason other than the breakage of some important part of the plane or engine, or its failure to function, or simply because the plane would go no higher.

For there are times when an airplane

Official Photograph, U. S. Army Air Corps

THE AMERICAN HIGH-ALTITUDE AIRPLANE "XCO5-A"

The supercharger and intercooler are shown on the side of the airplane.

is just that stubborn, and, no matter how one tries, it cannot be forced upward another foot. Each airplane, in fact, has its "ceiling," higher than which it cannot climb. This limit depends mainly upon the weight or load carried and the power of the engine. The type of wings and propellers used are also factors of importance.

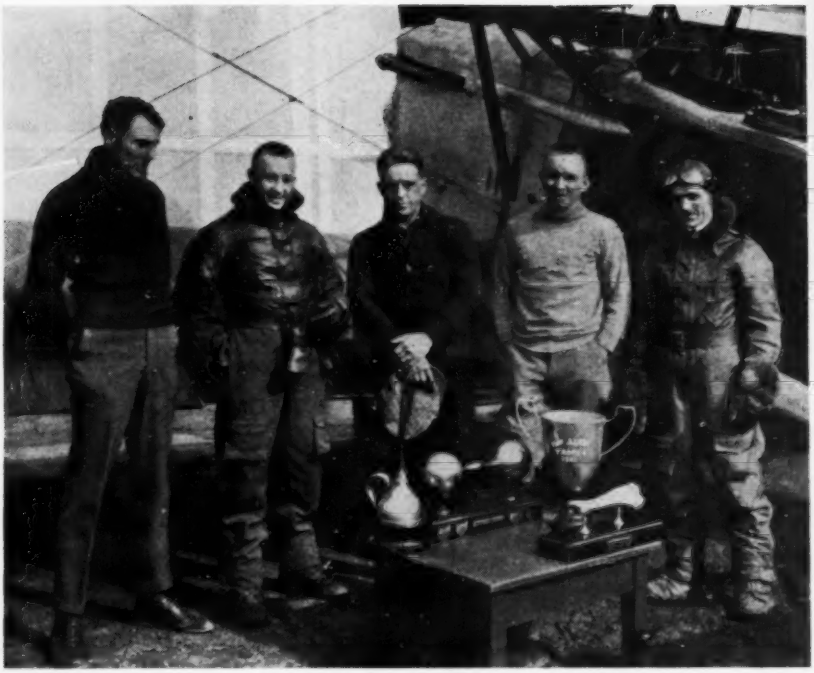
The height to which an average unsupercharged airplane can climb is rarely above 16,000 or 17,000 feet. The Barling Bomber, the world's largest airplane, which weighs 42,000 pounds when fully loaded, has with this ultimate load a ceiling not over 3,000 feet. For the T-2, the airplane in which Lieutenant Oakley G. Kelly and I made the transcontinental non-stop flight of 2,700 miles from New York to San Diego, the absolute ceiling with 11,000 pounds of load was the ground. In other words, with this load, under sea-level conditions, the total lift of the wings exactly balanced the force of gravity.

We had 10,850 pounds of load for the final take-off, and with this weight the absolute ceiling was 2,700 feet. This fact made it necessary to pick our course, so that we would not have to cross mountains during the first stages of the flight. As the fuel was consumed, our load gradually lightened and our ceiling lifted, until when the Rockies were reached we easily scaled them.

When an airplane is at its ceiling, it is in a state of balance or equilibrium and swings or rolls with very little balance of the controls, which are powerless to force it higher.

Such ceilings as I have cited, however, are extremely low compared to those dealt with in high-altitude flights, where the question of rare air adds its complications to the problem; for, as the altitude becomes greater, the air becomes less dense and its power of pressure within the engine falls off.

This statement becomes clearer if we realize that the air pressure, which at sea



Official Photograph, U. S. Army Air Corps

TEST PILOTS WITH THEIR TROPHIES

When a test pilot injures a plane as a result of bad judgment, he is presented with the bone, the dumb-bell, or the alibi trophy. From left to right, Lieutenant Barksdale, Lieutenant Macready, Lieutenant Wendell H. Brookley, Lieutenant Van Veghten, and Ralph G. Lockwood, civilian.

level, where we normally breathe, is 14.7 pounds per square inch, at 35,000 feet has diminished to 2.5 pounds per square inch, and that a Liberty engine which at sea level develops 400 horsepower, at 25,000 feet, because of this thinner air charge, can, with all its efforts, muster forth but 87 horsepower; and at 35,000 feet, of course, even less.

Obviously, the engine cannot force a heavy airplane higher on a starvation diet, and it was realized early in the altitude game that, to enable it to do so, some mechanical aid would have to be devised to keep it supplied with air of sea-level pressure—air that would feed to it its necessary quota of oxygen even when it traveled above the normal oxygen zone.

The Supercharger Makes High Altitude Possible

To fulfill this need a device was invented which compresses the rare air of the high altitude to sea-level density and forces this compressed air into the carburetor, which in turn sends the proper combustive mixture to the engine cylinders.

This instrument, called a supercharger, will increase the ceiling of any plane upon which it is installed thousands of feet; more than that, with sea-level power in its engine, the climbing ability of an airplane is greatly increased, as this rare

air offers much less resistance to the airplane surfaces than does the denser air of the lower altitudes.

The supercharger which I have used on my extreme altitude flights is a turbine wheel, which is revolved at great speed by the exhaust gases of the engine. Tests have shown that this turbine wheel, approximately one foot in diameter, makes about 40,000 revolutions per minute at 38,000 feet. It is difficult to conceive of such speed, equivalent, as it is, to 666 revolutions per second.

It is rather incongruous to think of generating heat from this thin, frigid air, sometimes colder than eighty degrees below zero, Fahrenheit. When compressed by the turbine supercharger, however, its temperature rises almost instantaneously, so that a radiator or inter-cooler had to be designed as part of the supercharger mechanism to cool the air before it reached the carburetor and cylinders.

Pilot's Dive Through Clouds Extinguishes Fire

Before the perfection of the inter-cooler, this hot air caused preignition and malfunctioning of the engine, cutting short many a test flight. During the early experiments with superchargers, in fact, something was always sure to break in flight. Pipes and bearings have failed and parts of the supercharger have flown off in mid-air, making it necessary for the plane to descend in trouble.

One test I shall never forget. I had gone up against my better judgment, as the sky was completely overcast with clouds at 20,000 feet; but the test was an important one, the engineers being extremely anxious to acquire certain data before letting a large contract.

Roy Langham acted as my observer on the flight, and we obtained most of our information before reaching the clouds; then thrust up through them, as what we had acquired would be of no value unless the test were completed.

Above the clouds we flew a level or speed course at full throttle. Toward the completion of this course fire broke out in the engine, ignited the lubricating oil, and a dense cloud of smoke poured forth. I immediately plunged downward through the clouds, the dive putting out the fire, although the engine mount was still smoking.

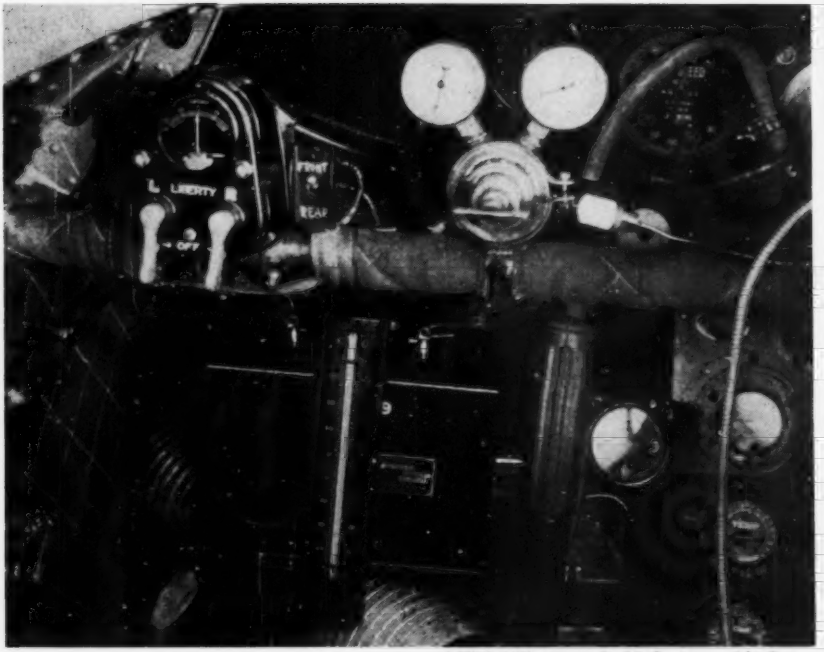
I was lost. I could not see Dayton below or any recognizable landmark. Before we went up, Langham had been instructed to keep tab on our location, as I would be busy with the instruments. Now I turned about as well as I could in my bulky clothes and oxygen mask and tried to let him know by pointing decisively toward the ground, that I had lost my bearings; then I turned to straighten up the ship.

When I turned again, Langham was over the side of the plane with his parachute, thinking I had motioned him to jump because of fire. I grabbed him and pulled him back just in time. Had he jumped it might have been a weird joke on Langham, as parachutes were far from their presently highly developed stage at that time, and a safe landing was not nearly so assured to a flyer who trusted his life to one.

On another occasion the propeller, whose revolutions per minute greatly increase in the lighter air, acquired such high speed at 28,000 feet that it flew off, knocking off the air-speed indicator and breaking the wing strut to which the indicator was attached.

Combating Cold 83 Degrees Below Zero

I hope such instances may prove my point, that it is the failure of his craft or its equipment, rather than his own failure to withstand the hardships of his journey, that sets the limit to the height that a pilot may fly. Nevertheless, physical hardships there are and of a type not to be belittled. Principally they consist of cold, lack of oxygen, and lack of sufficient air pressure—foes which are probably more treacherous to the body of the modern altitude airman than were Scylla and Charybdis to the ancient Greek adventures.



Official Photograph, U. S. Army Air Corps

SOME OF THE INSTRUMENTS WHICH THE PILOT MUST WATCH
The illustration shows the front of the pilot's cockpit in the XCO5-A, ready for a high-altitude test.

Perhaps the least hazardous of these is the cold, although in the upward climbs temperatures as low as minus eighty-three degrees Fahrenheit are encountered. There is no way of shutting out such frigidity. It eats straight to the marrow. The principal defense against it is plenty of warm clothing.

Under my uniform I usually wear two or three suits of woolen underwear and over it a heavy knitted garment of wool, with a thick, heavily padded, leather-covered suit of down and feathers over all. Furlined gloves, fleece-lined moccasins over my boots, and a leather head mask lined with fur, which with the oxygen mask entirely covers the face, complete the costume.

The goggles are coated on the inside with anti-freezing gelatine, supposed to prevent the formation of ice up to minus sixty degrees Fahrenheit. When ice forms on the inside of goggles, the pilot is completely devoid of vision.

Electrically heated suits have not proved practicable for such flights thus far, for they mean but another system of wires and switches for the aviator to add to his already complicated list of controls, and should anything go wrong with the wiring the suffering would be too intense for continuation of the flight, even if the extreme cold, with the other adverse conditions, did not cause unconsciousness.

The Engine Heats the Cockpit

As a further protection, the cockpit of the plane is lined with an air-tight insula-

tion of felt, which eliminates the drafts, and part of the engine heat is conveyed into it through a tube covered with asbestos to prevent loss of heat by conduction to the outer air. The cockpit heater is effective until the descent is begun; then the engine gets very cold, as it is throttled for the downward glide to earth.

When I first took up high-altitude flying, however, the cockpit was not reinforced against the cold, and part of the pilot's body extended out in the blast of a 200-mile-per-hour wind.

As the blood circulation is low at high altitudes, my hands suffered most. I have many times had my fingers become so stiffened that they were totally useless, making it necessary to control the plane with the base of the hands or the wrists. In such cold it is easily within the bounds of possibility for a hand, foot, or even a leg to become frozen and the use of the member lost. Fortunately, the cockpit improvements came about before such a catastrophe happened to me.

Theory has always held that the temperature above a certain altitude is constant, both summer and winter; but flights during both seasons have disproved this. The temperature varies from ten to twenty degrees at different times of the year or during different days, weeks, or months.

Temperature Often Rises When Pilot Goes Beyond 35,000 Feet

This year I made three flights during January and February, the months during which I have noted the lowest temperatures, to altitudes above 37,000 feet, encountering temperatures colder than eighty degrees below zero, Fahrenheit. However, on April 10 I found a temperature of eighty-two degrees below zero, Fahrenheit. But this was apparently an unusual condition and not characteristic of the season.

This year, for the first time, I have attained altitudes such that the temperature, having already reached its coldest point, had begun to rise. On January 29, at 37,000 feet, a temperature of eighty-one degrees below zero, Fahrenheit, was noted. At 38,704 feet this temperature had risen to seventy-six degrees below zero, Fahrenheit.

A month later, at 35,000 feet the temperature was seventy-seven degrees below zero, Fahrenheit, and at 36,000 feet it was sixty-eight degrees below, at which point it remained up to an indicated altitude of 39,000 feet (Fédération Aëronautique Internationale), which was the airplane's limit.

This region of warmer air at the higher altitudes is called the stratosphere of the earth. I have penetrated into the stratosphere only about 4,000 feet, but I would certainly not care to pose as "September morn" at the temperatures there, even though they are warmer than those found at lower altitudes.

An investigation of upper-air temperatures was conducted on Catalina Island, about thirty miles south of Los Angeles, during the year 1913. On August 3 two light, gas-filled, rubber balloons were connected and sent up, carrying a recording barograph. They ascended until the larger of them burst, because the air pressure without had become so much less than that within it, and the other, being unable to maintain alone the weight of the barograph, descended, bringing down its record of atmospheric conditions.

The temperature recorded was ninety degrees below zero at an elevation of eleven miles (58,000 feet). A temperature of 133 degrees below zero was obtained at the same altitude above Batavia, Java, near the Equator, November 5, 1913. Such data have been verified at various other places over the globe, but of course no man has ever penetrated such heights to date.

How the Lack of Oxygen Affects the Airman

Difficult as the cold is to combat, however, the lack of sufficient oxygen is even harder. One keeping close to the earth's surface, where he has the constant necessary supply without even having to ask for it, cannot realize its importance in

Official Photograph, U. S. Army Air Corps

TAKING ON A SUPPLY OF LIQUID OXYGEN

every breath he draws, as does the altitude airman.

When a flyer reaches an altitude of 20,000 feet a peculiar depression takes possession of him. The sky looks gray and dreary, he feels a queer lassitude, and his faculties are greatly slowed up. He inserts the oxygen tube in his mask, and with a few deep breaths the whole world brightens. He is a different man, ready to think and act quickly.

Up to 30,000 feet, as long as he gets plenty of oxygen, he feels no discomfort. Above 30,000 feet, any exertion makes him realize that he needs more and more of it. If he stoops to make an adjustmen, the instruments in the cockpit become dim and shaky. It is difficult for him to focus his mind upon what he is trying to do.

The great danger lies in the fact that in this light air pressure he cannot assimilate all the oxygen he needs. It is impossible for the lungs, with their capacity of taking in the necessary amount of air at ground levels, to take in five times the volume, as they would have to do at 35,000 feet to get an equal amount of oxygen, if the flyer were not supplied with the artificial variety.

To do this the lungs would have to expand to five times their natural size. Even when breathing almost pure oxygen in this light medium, they do not seem to receive a sufficient amount and it makes flying at such heights exhausting in the extreme.

Most pilots begin taking oxygen at 16,000 or 17,000 feet, using more and more of it as they ascend. Formerly this artificial oxygen was used in the gaseous form; more recently liquid oxygen has replaced the gaseous almost entirely, except in emergency.

Gaseous Oxygen is Carried in Steel Flasks

The present gaseous oxygen, however, is a greatly improved product over what it used to be. It is no longer apt to contain impurities and moisture, which were wont to freeze in the tubes, shutting off the supply; nor does it sicken the flyer by having a slight but perceptible taste. In

the plane, it is carried in steel flasks weighing about twenty-five pounds.

Considering this weight, I broke an extremely important record during one of my early flights, according to a Cincinnati newspaper. When a pilot opens up an oxygen valve, in flyer's lingo, he "cracks an oxygen flask." On this flight the airplane was equipped with two separate systems of gaseous oxygen, the main system and an emergency system. Just before the airplane reached its ceiling, trouble occurred, the main system becoming clogged with ice. I "cracked the emergency flask."

Upon reaching the ground I happened to mention this to a newspaper correspondent, and was somewhat dazed the next morning to see in black and white that at 39,000 feet—altitude was measured in a different manner at that time—Macready had felt the need of oxygen; so, reaching for his emergency flask, he had cracked it over his head, getting relief. According to this statement, I felt I could lay undisputed claim to the solid ivory championship, as the hardest-headed man in the world.

Liquid Oxygen is "Dry"

The great advantage of liquid oxygen over gaseous oxygen is, paradoxically, its absolute "dryness," having no moisture to freeze in the tubes, and the fact that the pilot begins taking it at the ground in a barely noticeable flow, receiving it automatically in gradually increasing amounts, as he ascends, whereas in the gaseous form he begins taking it when he feels that he needs it.

The liquid oxygen is poured into a container on the ground. Constantly boiling, it evaporates into a gas, which is breathed into the flyer's lungs through his mask. As the atmospheric pressure decreases with altitude, the liquid boils more rapidly, so that increasing amounts are made available. At great heights the oxygen comes through the tubes with such force that it blows the flyer's lips apart.

The Treachery of the Upper Air

Reliable as this system is, however, it has its loopholes for error which might easily cost a life. On one of my more recent flights the amount required was miscalculated by the engineer in charge, and at 35,000 feet I began to feel dull and irritated. Objects on the ground, as well as the instruments before me, became blurred and unsteady. Suddenly it struck me that I was losing consciousness. Major Schroeder's experience flashed across my mind.

I placed my tongue to the end of the tube supplying oxygen to the mask and found scarcely any pressure at all. Immediately I put the emergency tube into service, breathing deeply of the life-giving gas, and the whole world brightened.

It may seem strange that I did not know sooner that the supply was running low, but I had no idea that the container did not hold its usual ample amount, and so gentle is this "passing out" process at high altitudes that it is apt to take the flyer absolutely unawares, if he is not on his guard against it.

Therein lies one of the upper air's subtlest treacheries, emphasizing how much the airman's life is dependent upon the small, flimsy tube which connects him with his oxygen system, without which he could not remain conscious above 30,000 feet for even a short time.

While equipment for alleviating the intense cold and for supplying oxygen has been well perfected in recent years, nothing has ever been found which will do for the human mechanism what the supercharger does for the engine mechanism in the areas of decreased air pressure above 30,000 feet.

For the human body, fashioned to thrive in an air pressure of 14.7 pounds per square inch and having through the long ages built up an equal air pressure within its walls, feels in every nerve and artery the inequality when that pressure outside has diminished to 2.5 pounds per square inch.

In the airplane engine, as I have noted elsewhere, this difference causes a drop

from 400 to 87 horsepower. The light rubber balloons sent up to obtain wind directions or temperatures at high altitudes rise until this outer pressure becomes too negligible for the force of the inner pressure, when they burst.

Airman Failed to "Explode for Science"

This latter fact was responsible for another strange misconception which was detailed to the public through the pages of the press. Awakening one bright Sunday morning, I found staring at me from the front-page headlines, in bold type, the announcement, "Macready to Explode for the Benefit of Science."

I confess I was rather frightened, for life was sweet at the moment and I had no desire to have it terminate, especially in such an undignified manner. I read the article. It was written by a correspondent I had never seen and who had attributed to me statements I had never even imagined in my wildest dreams.

The writer knew that I was about to make an altitude test, taking a plane up as far as possible. Having heard of the fate of the small rubber balloons, which also went up as far as possible, he drew the conclusion that the low air density would have the same effect upon the human body.

The article, which was broadcast generally throughout the land, inspired a minister in Cleveland to preach a sermon upon the asininity of Macready, caused considerable editorial comment along similar lines, and was the occasion of many telegrams and letters some of them earnest, some uncomfortably humorous. It was a bit chastening, of course, to have been considered quite as empty as a rubber balloon, and although at the time I may have felt an explosion imminent, it was one of an entirely different variety.

So far, the difference in air pressure, although a hardship during the flight, seems to have no permanent injurious effect upon the flyer. How much higher he will be able to force his way in spite of it is a problem. Unless some artificial aid is devised, it will probably form the barrier which will eventually limit his progress through the stratosphere. The Army Air Corps has been keenly interested in overcoming this greatest of all handicaps, but to date none of its experiments has proved practical.

Several years ago one of these experiments took the form of a pressure cabin which was built upon a plane. It was a round affair, about as big as a good-sized barrel, constructed of steel, and practically air-tight when the door was closed. A hole, six inches in diameter, was cut in the top of the cabin and one of the same size in the left side. Both were closed with heavy plate glass, through which the vision was not particularly clear.

The cabin was entered on the right side, through a round, solid steel door, twenty-two inches in diameter, which closed and locked from the inside. It was almost necessary to use a shoehorn to get through this opening, and I felt, as I locked myself in for the first test, as if I were going over Niagara Falls in a barrel.

Pressure was built up within the cabin by means of a small, wind-driven compressor. A valve operated by the pilot for relieving the pressure was at the top of the cabin.

After the airplane had climbed a few hundred feet, the pressure within the cabin began to build up faster than the relief valve could let it escape. I tried to get the door open to permit an equalization of pressure with the outside air, but found this inside pressure so great that it was impossible for me to move the door inward, much less open it.

As the pressure was rapidly increasing, I faced the predicament of finding myself trapped. I throttled the engine and glided back to McCook Field as slowly as possible, in order that the small propeller operating the wind-driven pump would decrease its revolutions and thus cut down the amount of air being forced into the cabin.

The landing was a poor one, because

Official Photograph, U. S. Army Air Corps

IN THE COCKPIT OF THE "XCO5-A," READY FOR TAKE-OFF

Note the heavy clothing, oxygen tube, and mask worn by Lieutenant Macready, and the fire extinguisher on the side of the plane.

of the slow speed at which the plane was glided and the almost complete absence of visibility, but the airplane was not injured and now reposes in the McCook Field Museum. The general consensus of opinion, however, following this flight was that the lack of sufficient air pressure was of less danger to the pilot than being cooped up in this metal coffin.

Trains Like a Prize Fighter for Altitude Flight

Without the successful mechanical aids previously described, such altitudes as have been gained would have been impossible; but another essential prerequisite to a successful high flight is the flyer's first-class physical condition. In preparation for heights tests, I usually follow the same system of training that I followed several years ago at Leland Stanford University when I was preparing for what subsequently proved to be the amateur lightweight ring championship of the Pacific Coast.

This consisted, in general, of a run in the morning before breakfast, plenty of other exercise, and extreme care regarding diet and sleep. Early morning running, which in winter must be done in partial darkness, has often been accompanied by the barking of dogs, and once resulted in my being stopped by the neighborhood watchman as a suspicious character.

With plane, equipment, and pilot in readiness, the weather also forms a consideration of primary importance. The sky must be clear. On a cloudy day, with the ground out of sight, the pilot might easily drift for several hundred miles from his starting point and find himself without sufficient fuel to find a safe landing spot.

Moreover, should he have topped the world's altitude record, he must, to have official recognition, land on the same field from which he started, in full sight of the official observers of the Fédération Aëronautique Internationale, which is the international governing body on aviation contests.

Why Altitude Flights are Made Chiefly in Winter

Because there is less violent contrast between the temperatures at high altitudes and those at the ground in winter than in summer, most altitude flights are made at that season of the year, although the sky in the vicinity of Dayton is cloudy the greater portion of the time. For example, there was but one clear day in Dayton during the entire month of February, 1926.

All weather information possible is usually obtained from the local forecaster on the day before the flight is planned. However, even with a clear day forecast and having become an actuality on the given morning, within a few hours the sky may darken.

In fact, having used all precautions and started up with the sky clear, I have had the clouds drift in under me and, although attempting to keep my location, have found myself completely lost, coming down through them forty or fifty miles from Dayton. I have always been fortunate enough in such instances, however, to locate myself and get back to McCook Field without landing elsewhere.

How a Test Flight is Staged

One morning after waiting, perhaps for weeks, a day dawns crisp, cold, sunny, and cloudless and remains so. One of the first things to be done is to telephone Mr. Orville Wright, who, with his brother, Wilbur, invented the airplane and who serves as the representative of the Fédération Aëronautique Internationale in the United States.

He and several other prominent business men of Dayton, who give freely of their time to this work, act as the official observers of the flight.

Because the vitality is at its best in the morning, these flights are always made in the forenoon, as early as possible.

At the field the plane is being tuned up and made ready to go. The liquid oxygen is poured into the container, the instruments are carefully inspected and sealed by the official observers, according to the international ruling.

Considerable time is required to get into heavy clothing and don all the paraphernalia of high-altitude equipment. Newspaper men, photographers, and moving-picture operators are on the scene, and they take more time. But at last all is in readiness, and, with the call of good wishes in my ears, I climb into the plane and taxi down the field for the take-off.

The Sensations of High Flying

On any climb one must keep his eyes fastened on a city or distinct object, as he ascends. I usually start mounting in circles around Dayton until I reach about 50,000 feet; then turn due west, the speed of the plane making small progress against the heavy prevailing head winds. This wind, in fact, has been so strong that, even when heading directly into it, I have been blown backward for some forty miles.

I see Dayton grow smaller and smaller. If I take my eyes from it to observe the instruments or to make some adjustment, I may not find it again or I may get it confused with some similar place on the broadened horizon, if the plane has shifted its direction while I have been occupied. On one flight this happened and I picked up a small smudge which I thought to be Dayton, but afterward found to be Springfield, about thirty miles away.

As the plane continues its climb, the flyer becomes aware of the changed atmospheric conditions through all his mind and body and begins to guard against their effect upon him. How far can he go without collapse? There has never been any special fear in this problem for me, for I have always felt that the final moment of extreme danger could be realized in time.

If it were not and the pilot became unconscious, I believe the determination, concentration, and worry undergone in attempting to keep from loss of consciousness would bring him to normal again when lower altitudes were reached,

in the same manner that one automatically awakens from sleep at a certain time if determined to do so beforehand.

Fear Plays no Part in Airman's Emotions

Nor is there any fear of the height. Height is part of an aviator's life, just as driving an automobile is part of the average man's. It is only when some calamity brings possibilities home to the driver that he thinks of his car in connection with danger. This also holds true for the airplane.

In practically all extreme altitude attempts, the plane reaches its limit about the time the pilot grits his teeth in anticipation of pushing farther upward. One isn't thinking as clearly as usual at this height, and it takes some time to convince oneself that the plane's ceiling has actually been reached. I usually remain at this altitude for some half hour, endeavoring to make adjustments or change the functioning of the supercharger, coaxing the plane higher.

The control wires contract in the extreme cold and are very tight, and the lubricating oil on the pulleys over which the control wires operate freezes. As a result, the controls are difficult to move.

The plane wallows about as in a trough, but will not lift its nose an additional foot.

Hoping that I have bettered its previous records, I turn its nose downward for the descent, a much quicker operation than the climb, and when I reach the ground the crowd comes hurrying forth, anxious to learn the results, which have been recorded by the instruments.

Twenty-two instruments were in the pilot's cockpit of the Le Pere 53, the airplane in which I broke the world's altitude record. But the history of the flight itself is recorded on smoked paper—ink would freeze—by ten recording instruments located in the rear cockpit.

These graphs tell the full story of what has happened at each stage of the climb, and they can be coördinated as to time. The different temperatures and pressures which have prevailed within the engine are set down, as are the revolutions of the engine, atmospheric pressures and temperatures, and altitudes.

Two recording barographs are usually carried in the plane, so that if something happens to one, the other may bring down in dependable form whatever achievement has been made. Nothing is left to the imagination of the pilot. No altitude record to-day would be officially recognized without automatically written accounts. Upon the completion of the flight, these records are also carefully studied by the engineers and steps taken to remedy any defects indicated in the plane, engine, or equipment.

Even after a written barograph record is obtained, however, scientists do not agree as to the correct method of computing from it, in feet and inches, the height which has been attained. The reader has undoubtedly been thinking of the distance as it would be measured by a plumb line from the plane to the ground. Such a method would be a great boon to pilots, engineers, and scientists; but, with a plane climbing in circles, drifting away from its base for miles and out of sight of the ground, it obviously cannot be done in this way.

Discouraging Discrepancies in Measuring Altitudes

It is only when heights are fixed, as with mountains, and can be seen as angles and distances on the ground, that the obtaining of actual measurements becomes a simple matter.

Actual heights from the air can at present be measured only through photographs of points on the ground the distances between which are definitely known. Captain A. W. Stevens and I took a photograph of the city of Dayton from the greatest height from which a photograph has ever been taken—32,000 feet—by this concrete method of reckoning. According to the measurements of the Fédération Aëronautique Internationale, which prescribes the manner of calculating all aviation records, the altitude obtained that day was 31,000 feet, while the altimeter indicated 35,000 feet.

The Fédération has established a table of arbitrary temperature corrections based on the theory that the temperature at extremely high altitudes is constant. Actual experience, however, has shown this not to be true; hence the computation is seldom in accord with what would be the correct computation from an engineering standpoint.

Cold air is heavier and more dense than warm air; a lower column of cold air will give the same pressure as a higher column of warmer, lighter, less dense air. Therefore altitude should be based on density, which in turn should be based on the temperature actually encountered in flight.

In the Dayton photograph the difference between the actual altitude reached and the altitude as computed by the Fédération method of reckoning, because of atmospheric conditions, was not great. Frequently it amounts to 6,000 or 7,000 feet. For instance, my highest official altitude record of 38,704 feet, if measured by a surveyor's chain would be approximately 44,000 feet.

It is very discouraging to a pilot, when his cockpit instruments have given every indication of the plane being considerably above the height of the world's record, to have the barograph calibration bring the altitude down to a few hundred feet below it; and this has happened to me several times.

Lonely Work at the Earth's Ceiling

The question I am most frequently asked after an altitude flight is, "What did it look like up there, Mac?" Always after I have reached the plane's ceiling I look straight downward over the side and get a great "kick" out of the view almost eight miles vertically beneath me.

During January and February of this year it was my good fortune to take off on days which were very cold and clear, immediately after a heavy snowstorm, which had washed the atmosphere clean. The ground temperature was zero, Fahrenheit, too cold to be enjoyed by the shivering observers. The earth was pure white, but was dotted and speckled with black. Each of these little dots or smudges, which indicated the position of a city, was trailed by a streamer of black smoke.

From my position over Dayton, Ohio, I located the smudges of Indianapolis, Cincinnati, Columbus, and Toledo. The size of the city was indicated by the varying lengths of smoke trails. There have been times when the air has been full of dirt and mist, when it has been almost impossible to see the ground; but I could usually find a minute thread of river, usually the Miami or Ohio, breaking through to help me check my position.

In the spring, summer, and fall of the year, when the trees are in leaf, the colorings of the cities and fields blur and blend until, at a distance, even the smoke trails becomes indistinguishable. But always this view is a magnificent thing, and one can easily imagine himself a superior being looking upon the work of Lilliputians, so infinitely small does the product of man's labor seem.

But the pilot does not dare let his slow-thinking mind turn to philosophical reveries. Instead, he must face the frigid, biting wind, with its attendant discomforts of smoke-begrimed goggles, oxygen mask, and other unnatural appendages, and see to taking his plane safely back to earth. He is quite willing to figure once more in the actions, hopes, and dreams of his fellow Lilliputians.

It is lonely work fighting the elements at the Earth's ceiling, but I hope that my six years spent in high altitude experimental work have produced something of value to our Government.

BOMBERS of the BLACK CROSS

GERMAN BOMBARDMENT AVIATION IN WORLD WAR I
By CAPTAIN RAYMOND H. FREDETTE, USAF

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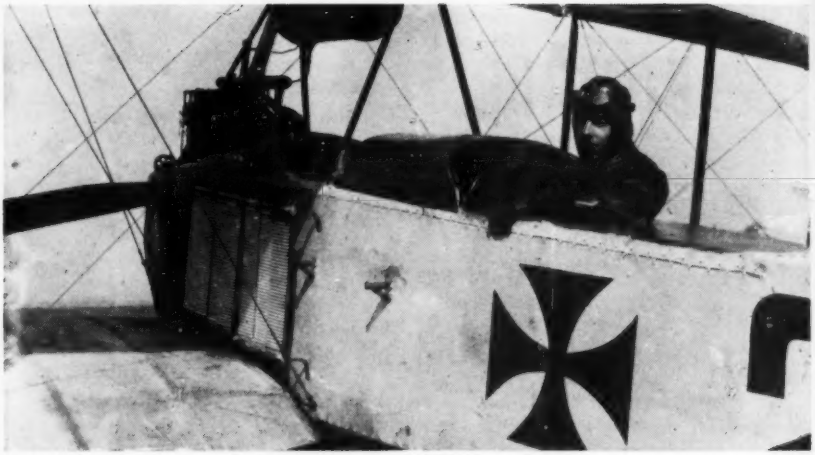
PART I

From Carrier Pigeon Squadrons to Kagohls (1914-1916)

IN late October 1914, the waters of the North Sea literally washed out Germany's first plans for "strategic" attacks with a new and untried weapon — the bomb-carrying airplane. Swirling through sluice gates opened by the desperate Allied defenders of the Channel ports, the waters of the sea reclaimed the marshes inland from the Flemish, coastal town of Nieuport. The narrow, sluggish river Yser swelled into a wide moat before the German forces sweeping down from Antwerp. The frantic drive "nach Calais" bogged down in the mud of the flooded lowlands. In the backwash of the furious fighting, the Imperial German Army's only airplane bombardment unit was left stranded, short of its intended destination, behind the rapidly solidifying front.

Until the following spring the German airmen and their frail aircraft remained at Ghistelles, a small village near Ostend, where they had been assembled. Calais, from where they had hoped to bring the war to English cities, would become a target, but never a base. The would-be bombers of England, flying unarmed, two-place machines in which the pilot sat to the rear of the observer, had to be content with targets more in keeping with their capabilities. Their meager bombs



Similar in design and power to the unarmed, B-type plane flown by the Ostend Detachment until early 1915, is this 1916 training machine. An Aviatik, this model is powered by a four-cylinder, 80 h.p. Argus engine. Lt. Kurt H. Weil is seated in the instructor's cockpit. Now a U. S. citizen, Weil is a professor at Stevens Institute of Technology, Hoboken, N. J. Note the gravity fuel tank hanging from the upper wing.

were dropped instead on Dunkirk, Nieuport, and other places immediately behind the front.

In late December a German aviator managed to retrace the trail blazed by Louis Bleriot, only four summers before, to bomb Dover. But he was not from the Ostend bombing unit, flying instead a seaplane of the German Navy. More daring than dangerous, this attack is recorded as the first "air raid" in Great Britain's history.[1] (Charles G. Grey, *Bombers*, Lond., Faber & Faber, 1942, pp. 19-20.) Actually two-and-a-half more years would pass before the airplane — the one instrument of war which irrevocably shattered England's detachment from the clash of arms on the Continent — could be considered anything more than a nuisance in its bomb-dropping efforts beyond the Channel. Though ominous enough, England's only real concern in the meantime would be the pulsating, high-flying Zeppelin.

In retrospect, the gathering of six squadrons in September 1914, to bomb England from the air appears almost naive. Because of the range and bomb capacity of its machines, this special unit hardly could be any more innocuous than its official designation. Intent on concealing its offensive purpose, the German Army High Command had called it the Carrier Pigeon Detachment of Ostend.[2] (*Brieftauben-Abteilung Ostende.*) Undoubtedly, the High Command also wanted to guard the unit's security. It was based within the sound of guns, little more than a dozen miles from the front.

More significant, perhaps, the Germans were not entirely insensitive this early in the war to existing laws of war on indiscriminate aerial warfare. The Hague Conference of 1907 had prescribed, at the instigation of France, against the dropping of bombs from aeroplanes. Fortified places, or localities of immediate military importance in the battle area, were not protected against this form of attack. British cities, obviously, were not legitimate targets according to the rules of war.

The Germans soon felt justified, however, in openly disregarding these limitations. By the end of 1914, the Allies themselves had made air attacks on Dusseldorf, Friedrichshafen, and Freiburg im Breisgau.[3] (Cf. Ernst von Hoeppner, *L'Allemagne et la Guerre de l'Air,* Paris, Payot, 1923, p. 51.) But in bombing Freiburg, the French were retaliating primarily for the earlier, sporadic flights of the bat-like Taubes over Paris. German bombs, though few and minute, had caused some casualties among the gwaking Parisians.

In making these prankish raids, both sides sought some excuse in an axiom which equally governs children at play as well as nations at war — he hit me first! The British were the most realistic of all. They, in fact, made the first "strategic" attacks on the Germans. But these were essentially defensive operations. Their purpose was to destroy the Zeppelins in their nests before they could do any damage. Whatever the reason, the legal or moral problems of attack from the air were evaporated by the blowtorch of war within a few weeks after the start of hostilities. This was so for the Allies as well as Germany.

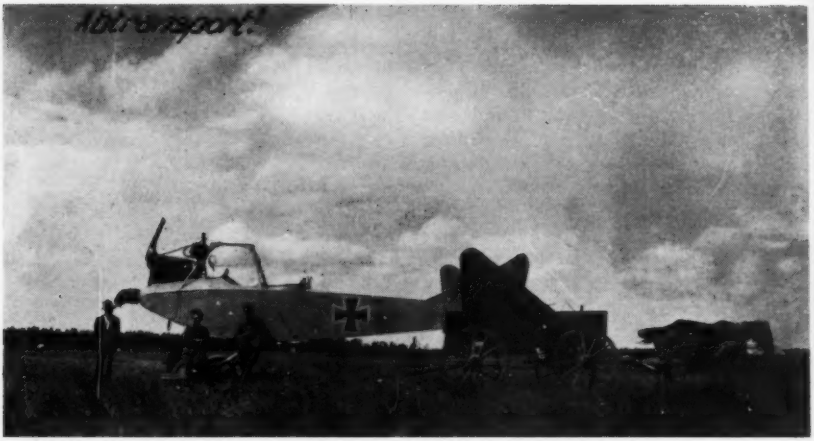
Technological obstacles, however, were not so easily overcome. The German "pigeons" at Ghistelles were powered by a single, 100 h.p. engine. Each could carry three, perhaps four, bombs weighing just over 20 pounds each.[4] (Cf. Comdt. de Castelnau, "Les Bombardements de Paris," *Le Correspondant,* Tome 291, 1923, p. 17. Germany had gone to war with a pear-shaped, aerial bomb weighing 10 kg. or 22.046 pounds.) With such puny means of destruction, the material effects of aerial bombardments could be anything but significant. The offensive hopes of German military aviation in 1914 were, by all standards, premature. But they were not stillborn.

German Concept for a New Weapon

The Ostend squadrons are highly indicative of the foresight with which the Germans viewed the airplane as a new weapon. By activating this special detachment, the High Command was acknowledging the air machine's inherent potential for other than reconnaissance. Eventually, the Germans developed the most varied air force of the war with several specialized types of aviation. But the initial, offensive role to be assigned was bombardment. What was to be the ultimate for a new dimension in warfare, they sought to do first, at least in theory before the end of 1914.

It is impossible to discuss the origins of strategic bombing without referring to many German "firsts." These relate to doctrine, tactics, bomber development, and even night operations. Yet, German innovations often are dismissed with little more than passing reference to the Zeppelins which soon became obsolescent. In view of their lead in this field, German preoccupation with the dirigible is quite understandable. But the usual interpretation is that the Germans concentrated on Zeppelins primarily because they were not sufficiently aware or convinced of the airplane's military value. What is overlooked is that before the war, and up through early 1916, the dirigible remained the best available "strategic bomber." It had range, carrying capacity, and, during the period mentioned, it was largely invulnerable to existing air defenses.

The Germans, however, did not choose to rely solely on airships. As early as 1915, they were feverishly developing and testing a two-engine bombing airplane, which made its first trial flight in January of that year.[5] (Walter von Eberhardt, *Unsere Luftstreitkraefte,* Berlin, Weller, 1930, p. 47.) By the time that the Zeppelins could no longer be used without disastrous losses, German bombers were available to continue attacks on long-range objectives. Despite the record, there is a tendency to assume that the enemy lacked foresight, or made all the mistakes, simply because he was defeated in the end. The German High Command of 1914 is even cited by at least one writer as having "completely



The Germans even relied on the horse for mobility. This dismantled Albatros C-II machine, flown by Lt. L. H. Weil, is being hauled back to its base by horse cart after making a forced landing on the Eastern Front in June 1917. Wings were also removed to permit the loading of planes on railroad flat cars. These along with sleeping cars, which served as headquarters offices and crew quarters, allowed the relocation of entire units in as little as a few days' time.

ignored Douhet's theories of total warfare!"[6] (Quentin Reynolds, *They Fought for the Sky*, N. Y., Bantam, 1958, pp. 29-30. Reynolds writes: "It is almost incomprehensible that the German High Command, so thorough in studying military treaties by experts of all nations, should have completely ignored Douhet's theories of total warfare. . . . The Germans . . . just dismissed the whole concept of an airplane being anything but an observation post, and a rather unreliable one at that." It is doubtful whether Douhet himself had any firm theories in 1914, much less having written a treatise for the Germans to study!)

The Ostend squadrons would indicate that the Germans had sufficient faith in the airplane to attempt implementing some theories of their own as to how it should be used in war. In practice, this was perhaps unrealistic at the time. It certainly was insofar as bombing England was concerned. But in theory, the Ostend Detachment is not surprising, nor is it difficult to see why the German High Command established it so early in the war.

Conceptually, many aspects of strategic bombing, either with the dirigible or the airplane, were to find a quick and ready place in the German mode of warfare. The High Command was nurtured on the Clausewitzian notion of "unlimited war." It subscribed to a policy of "frightfulness" or *schrecklichkeit* to numb an enemy's will to resist. But apart from the ingredient of terror, the airplane suggested other distinct possibilities to German strategists, even in 1914. They were aware that, in time, the bombing airplane could be made to deliver telling blows against an opponent's warmaking capabilities. Aerial bombardment was an obvious counterpart to an equally new type of strategic warfare being waged far from the battlefield with the submarine.

Still, the German concept of the period is rarely stated or assessed in proper perspective as a contribution to air doctrine. It suffers, perhaps, from lack of recognition because its development was

The development of a truly specialized German bombardment aviation was greatly furthered by the activation of pursuit squadrons during the Battle of the Somme in 1916. In that year the Albatros single-seater combat plane became renowned in the struggle for control of the air, and it retained its status as one of the leading fighters of the war up to 1918. The Albatros D-V shown above with Lt. Kurt H. Weil at the controls was dubbed "Le Petit Jaune" after its yellow nose. The D-V fighter was noted for its streamlining and a high-compression, 200 h.p. Mercedes engine which enabled it to attain speeds of up to 142 mph.

essentially impersonal or anonymous. There was no German Trenchard or Mitchell during the first World War. And after, when these exponents of air power really made their mark, the Germans had no wings to give flight to theories. But even during the war, German aviation had no outspoken advocate. If there were a German "air prophet," he remains hidden behind the omnipotence of the High Command. More important, he had no battle to wage for the mission of long-range bombardment. The High Command itself decreed it by creating the Ostend Detachment in the fall of 1914.

Top-level recognition of an offensive air mission by the Germans at the very outset of the war contrasts considerably with the British experience. There is no question that the British had the germ of a strategic air concept in 1914. But it failed to receive ready and full support at higher command levels. The bombing attacks on Zeppelin facilities made in the first months of the war were the exclusive work of the Royal Naval Air Service, which was responsible for Britain's air defense. And its special, "strategical bomber unit," which was acting on the premise that the best defense is offense, was soon disbanded because of the opposition of the British Army High Command behind whose lines it operated.[7] (E. J. Kingston-McCloughry, *The Direction of War,* Lond., Jonathan Cape, 1955, p. 70.)

Actually, the later, overriding pressure for full recognition of British air power, resulting in an independent air force in 1918, was more political than military. It was a direct consequence of persistent German air raids which caused "substantial material damage and great moral effect" on the home front.[8] (*Ibid.*, pp. 70-71.) This action by the British government, which then seemed drastic and ahead of its time, provides ample evidence of the impact of aggressive Ger-

man aerial attacks and the strategic concept behind them.

For German military aviation, high-level acknowledgment of the potentials of strategic air warfare opened a channel for the gradual but uninterrupted expansion of its bombardment forces under the Army High Command. This explains, undoubtedly, why the Germans felt it unnecessary to establish a separate air force during the war. The airmen of the Imperial Army were relatively unconcerned with a struggle "for" air power. They concentrated on waging battle "with" air power, such as it was at the time.

Unlike the British, the Germans did not set up any governmental committee to study and point out the implications of the airplane on warfare. Because they were not spelled out in open debate, the precepts of German air doctrine during World War I tend to evade enumeration and analysis. If they are to be considered at all, they must first be deduced from the actual German conduct of aerial operations during the war.

Carrier Pigeon Squadron: The Concept Takes Shape

Military aviation's only proven value at the outset of hostilities was for long-range reconnaissance. As for bombardment, a function that was quickly recognized but not so easily demonstrated, the early German concept was relatively simple. It could be no other since it depended upon extremely limited machines. The airplane of 1914 was nothing more than an unprotected means of transporting a trifling amount of explosives over comparatively short distances to a point above an objective. Once there, gravity and chance were relied upon to produce some degree of damage to the enemy below.

Little wonder that military commanders everywhere were firm in their opinion that the cannon was a much more destructive weapon. Even by the war's end most of them were to persist that there were few targets indeed, which definitely could be destroyed or rendered useless from the air. Yet, despite the obvious difficulties, the Germans assembled six squadrons for this very purpose in the fall of 1914.

Whatever may have been its capabilities, consideration of the Ostend Detachment reveals quite definitely that the German High Command already had arrived at some valid principles for organizing and conducting bombing attacks. And these principles, in many respects, pointed the way for later advances which were to make bombardment aviation truly feasible in practice.

Specialization of Effort

The first such guidepost was specilization of mission. The avowed, primary purpose of the Ostend unit was the bombing of industrial targets in England.[9] (Hoeppner, *op. cit.*, p. 51.) And since the unit was considered a specialized, elite force, only the most capable and experienced pilots were selected for its manning.[10] (Georg P. Neumann, *German Air Force in the Great War*, Lond., Hodder & Stoughton, 1920, p. 157.) The singling out of the Ostend squadrons for a distinct, offensive role is highly significant. At the time, however, there was little material basis for this differentiation of functions. There were only two types of German aircraft in 1914, and both were intended for reconnaissance. Of these, only the B-I biplane had a single, improvised mechanism for the attachment of bombs.[11] (France, Ministere de la Guerre, "L'Aviation Allemande," Fasc. VII, *Manuel d'Aviation*, Paris, 1917, p. 10.)

Admittedly, the German High Command, in specifying a bombing task for the Ostend unit, was doing little more than expressing an intent to use the airplane for other than reconnaissance. Though it was largely devoid of the means, it was this intent that provided the stimulus for specialization of airplane types which began in 1915. Also, discriminate selection of personnel was the first step in developing special training for bombing tasks. The evolution of German bombardment aviation, in fact,

can be outlined almost entirely in terms of a struggle for true specialization of effort.

German military aviation, however, was not even established as a distinct form of transportation in 1914. For purposes of administrative control, aviation at the time was but a component of the Imperial Army's noncombatant transportation forces, the *Verkehrstruppen.*[12] (*Ibid.*, p. 3. In addition to military aviation, the *Verkehrstruppen* included balloon detachments, motor transport, and railroad battalions. All were lumped together under the control of the *General-Inspektion des Militaer-Verkehrstruppen* in Berlin.) Consequently, the development of bombardment units has to be considered along with the advance of aviation as a whole, towards achieving status as a distinct corps of the German Army.

The first progress in this direction was made in early 1915. On March 11, an aeronautical section, separate from the ground transportation forces, was created by order of the Imperial Cabinet.[13] (Hoeppner, *op. cit.*, p. 70.) In addition to the airplane squadrons, this section comprised the balloon units and the meteorology service. Major Hermann Thomsen was appointed as the new Chief of Aviation, a staff position with little or no command authority. Its primary purpose was to provide some measure of centralization in airplane production and procurement, supply, training of personnel, and related administrative matters. Operational control of the auxiliary squadrons at the front remained in the hands of the armies to which they were assigned. The *Chef des Flugwesens* had even less influence on the operations of the Ostend Carrier Pigeon Detachment, which remained a concern of the Army High Command.

A few weeks after this upgrading of military aviation, the German squadrons began to be equipped with a new airplane, the C-type biplane. The first model of this series had an engine of increased power up to 160 h.p. More important, it was armed with a machine gun fired by the observer who now sat to the rear of the pilot. As a bomber, some models had two cylindrical bomb racks in the fuselage. Despite these improvements of what was the first German fighting airplane, it contributed little to furthering bombardment as an unique role.

This D.F.W. C-IV, named after its manufacturer the Deutsche Flugzeug Warke, was a 1916 model of the all-purpose C-type machine flown by German bombardment aviation from 1915 through late 1916. Although the bombing squadrons began at this time to convert to the two-engine G-type, the C series continued in use for reconnaissance, escort duties, and even as a tactical bomber to the last months of the war.

The C-type machine was an all-purpose craft, best suited actually for reconnaissance. Although armed, it lacked the speed and maneuverability needed for pursuit. For bombing, it was still a single-engine biplane of limited range and carrying capacity. With full gasoline tanks, this airplane carried a bomb load of approximately 110 pounds. The bombing of England, which had inspired the creation of the Ostend Detachment in the first place, still remained an impractical goal.

If anything, the C-type airplane blurred the distinction that had been drawn between the bombing and reconnaissance squadrons. Both categories were progressively equipped with this same machine. At about the same time an order was put out requiring all planes on operational flights, including reconnaissance, to carry bombs.[14] (Neumann, *op. cit.*, p. 57.) As a result, bombing became a routine chore for the reconnaissance units. This task was disliked by the reconnaissance airmen because the additional weight of bombs limited their range. Even worse, the extra load restricted their altitude, a matter of particular concern while crossing the battle lines due to the increasing effectiveness of ground fire. Reconnaissance planes usually made bombing attacks on an individual basis, as part of daily observation and photographic missions.[15] (For vivid accounts of the free-lance bombings of a German reconnaissance airman, see George Haupt Heydemarck, *Double-Decker C.666*, Lond., John Hamilton, 1931.) But not infrequently, entire reconnaissance squadrons were dispatched on bombing missions when the tactical situation demanded offensive air support.

Such uses of the reconnaissance units are understandable after April 1915. That month, the Ostend Detachment was transferred to the Eastern Front by the High Command, leaving the west without any bombardment unit. But, as a whole, the bombing efforts of the reconnaissance squadrons showed that one role was often accomplished at the expense of the other. The results fully justified the principle of specilization on which the Ostend squadrons had been based. Although the High Command realized all along the importance of a separate bombardment effort, it was not completely attained until 1917. By that time, the availability of the true bombing plane made this possible. Indeed, specialization was unavoidable since the large bombers were too vulnerable to be used for any other purpose.

Concentration of Force

Concentration of force is another principle characterizing the activation of the Ostend Detachment. From the very beginning, the German High Command integrated six squadrons into one unit for the bombing role. The Carrier Pigeon unit consisted of 36 airplanes under one commander, Major Wilhelm Siegert.[16] (Hoeppner, *op. cit.*, p. 51.) This is evidence enough of German emphasis on concentrated aerial bombardment even before the real beginnings of aerial warfare. It probably would not be inaccurate to say that, in the fall of 1914, no other aviation commander had as many airplanes under his immediate command as did Major Siegert. This was certainly true as far as the German Army was concerned. In mobilizing for war, the five existing aviation battalions had been parceled out for reconnaissance purposes on the basis of one squadron for each numbered army and army corps headquarters.[17] (*Ibid.*, p. 33.) The assembling of six squadrons at Ghistelles for bombing constituted, at the time, a tremendous concentration of aviation.

Even with such forces, the Germans were cognizant of the feeble, material results that could be expected. The High Command felt that the small bomb loads carried by these airplanes made it all the more imperative that as many of them as possible be combined. As a consequence, even the earliest raids of the war against the Channel ports were conducted by a relatively high number of machines acting in concert.[18] (It is interesting to compare German efforts with those of the Allies during this period. The R.N.A.S. advance unit which made the first strategic strikes from Antwerp, before the city fell to the Germans against Dusseldorf and Cologne in September 1914, consisted of four planes. Later, Friedrichshafen was bombed by three British planes. The French raid on Frieburg in December was made with only two planes.) In late January 1915, for example, the Ostend unit raided Dunkirk with 14 planes without losses, on what was incidentally its first night operation of the war.[19] (Neumann, *op. cit.*, p. 177.)

This striving for maximum results provided the incentive for the making of larger and better bombs. Along with this went an intensive effort to develop and produce the airplanes that could carry them. Amazingly enough, the weight of the heaviest German bomb reached 2200 pounds, the largest dropped in the war. It is even more surprising that the two-engine bomber of the day could be made to take off with such a load from grass fields. German bomber development went on to reach a peak with the Giant or *Riesen* airplane. Some models of this type had wing spans of approximately 150 feet, and depended on as many as five engines for flight.[20] (The name Giant was far from being a misnomer. The B-29 of World War II had a span of just over 144 feet.)

In waging a new and novel form of warfare, the Germans also relied on concentration of force to produce the greatest possible psychological impact. This effect, in most cases, was considerably greater than actual physical destruction. Although a target might not be destroyed, its evacuation even on a temporary basis was a damaging inconvenience to the enemy. Apart from concentrating several squadrons against one objective, the morale effect could be intensified by staggering the bombers so that the raid was stretched out timewise. Whenever possible, the Germans also made repeated attacks on the same objective within a short period of time.

Such tactics, obviously, were most effective against large population centers. Mass raids with the airplane against such centers were not really feasible until quite late in the war. But the concept of concentrated attacks begins to emerge in the earliest operations against such places as Dunkirk.

Despite these ideas on the delivery of air blows, the Germans were unable to apply them to the fullest, except for relatively brief periods during the course of the war. The dominant land strategy often dictated a redirection and dispersal of the bombardment effort to satisfy purely tactical needs. On such occasions, the German bombing units displayed considerable flexibility in fulfilling tasks which, though indispensable, were not properly theirs as bomb-carriers.

Squadron on Wheels

The Germans furthered concentration of effort by emphasizing mobility for their air units. This element in time became indispensable for continuing the struggle against the Allies whose numbers in the air increased steadily. Though it also expanded continuously from the start, German aviation remained about the same size as that of the French throughout the war. In the face of these squadrons combined with those of the British, and later the Americans, the German airmen were considerably inferior numerically. And for the better part of the war, they fought on three major fronts. Eventually, the success or failure of German air units, and even the ground forces, hinged on rapid movement needed to achieve and exploit local superiority at any point chosen for attack.

Built-in mobility can be found in the Ostend Detachment whose personnel were quartered in railroad sleeping cars.[21] (Nenmann, *op. cit.*, p. 157.) This allowed for quick relocation behind the front, or from one front to another. The frequent shifting of bombardment units became standard practice. The Ostend squadron, for example, were shuttled to the Eastern Front in the spring of 1915. After the German armies broke through at Goerlitz, they were returned to the west.[22] (*Ibid.*, p. 158.)

In some instances a temporary transfer to eastern battle zones, which were much less exhausting in the air, provided some recuperation for squadrons battered on the Western Front. The east was also a place where the operational use of obsolescent planes could be extended; or where new and untried models, particularly of large bombers, could be tested under combat conditions. But whatever the reason, the moves of air units were coordinated by the overall German stra-

tegy for war in many, far-flung theaters of operations.

Control From The Top

The development of a truly distinct bombardment aviation, its concentration to achieve maximum effects, and the deployment of its units to fight a multifront war — all depended on centralized control. This was perhaps the most important principle underlying the establishment of the Ostend Carrier Pigeon Detachment. By being under direct, top control of the German Army High Command, this bombardment unit and seven others formed by the end of the war, constituted a "GHQ air force."[23] (In this respect, German bombardment aviation of World War I is similar to our own GHQ Air Force whose command, under Brig. Gen. Frank M. Andrews of the General Staff, was separated from the Army Air Corps from 1935 to 1939. Cf. Alfred Goldberg, *History of the United States Air Force*, Princeton, Van Nostrand, 1957, pp. 39-41.)

This command prerogative exercised by the High Command was, in effect, tacit recognition that aviation, insofar as its strategic role was concerned, should be set apart from auxiliary air units assigned to armies in the field. In tactical operations, control of the bombing units was shared with army corps headquarters. The bombing of targets close to the front, such as railroad stations, supply dumps, and enemy staff headquarters, usually were designated by the army corps as required for the support of the troops on the line.[24] (Neumann, *op. cit.*, p. 166.) The High Command, however, retained exclusive control of all long-range bombing efforts. Air raids on Paris, for example, were conducted only on specific orders from the Army High Command, which considered such nontactical factors as reprisals for Allied attacks on German cities.[25] (Hoeppner, *op. cit.*, p. 172.)

Organizational Flexibility

Having accepted the offensive role of bombardment for its aviation, the High Command went on to set up an organizational framework commensurate with the task. Integration of the six Ostend squadrons was important for other than concentration of force. It also provided the basis for administrative control at a level that was indispensable for the mounting and conduct of long-range operations. From its origin, German bombardment aviation was organized and commanded on a footing above that of the squadron or *staffel*, the standard and basic aviation unit of World War I. The Ostend Detachment was the prototype of the *geschwader*, which, for lack of any further organizational evolution by the end of the war, combined the control and administrative functions of what later became the group and the wing.[26] (As applied to World War I, it is difficult to translate accurately the term *geschwader* as either a group or wing. Since it was the next higher level of organization above the squadron, the *geschwader* was very much a group and will be referred to as such in this writing. There were no other intermediary organizations, however, between the *geschwader* and the Army High Command. Therefore, in terms of command authority and responsibilities, the *geschwader* had all the attributes of a wing. The notion of a "bomber command," consisting of several *geschwadern*, remained undeveloped in Germany's first air force. British developments of 1918, which included an Independent Air Force solely for strategic bombing, were, organizationally speaking, ahead of those of the Germans by the end of the war.)

The early emphasis given bombardment aviation by the High Command becomes very apparent when its organizational development is compared with that of pursuit aviation. Actually, the first, specialized German airplane of the war was not the bomber, but the fighter. But when the Fokker, single-seater, E-type monoplanes first appeared in combat in the summer of 1915, they were not even organized in squadrons. For some time this pursuit type was assigned merely in units of four machines to serve alongside

the reconnaissance squadrons at the front for the latter's protection.[27] (Hoeppner, *op. cit.*, p. 136.) While the Ostend bombing unit of 1914 was comprised from the start of six squadrons, no pursuit unit was organized in squadron strength until August 1916.

Although the German High Command showed considerable foresight in organizing the Ostend Detachment, the growth of its bombardment aviation was extremely slow during the first stages of the war. This was due not so much to lack of concept as it was to the extreme primitiveness of the airplane at the time. For bombing, its deficiencies were particularly difficult to overcome. This role demanded much more than a mere flying gun platform. Even such a revolutionary innovation as the synchronized machine gun added little to bombing capabilities, for which range and carrying capacity were of the essence. And this required aircraft engines which were at the same time powerful and light enough to be taken aloft.

For these reasons, perhaps, a second bombardment unit was not formed by the High Command until August 1915, nearly a year after the Ostend Detachment came into being. This additional unit also was named a Carrier Pigeon Detachment, this one designated as being from Metz, since it was activated at a field near that fortress city not far from the front. Though not full strength at first, the Metz Detachment was built up eventually to six squadrons of six planes each to equal the Ostend squadrons.[28] (*Ibid.*, p. 75.) In anticipation that the new unit might be needed elsewhere along the front, its personnel also were quartered in railroad cars.[29] (*Ibid.*)

With this improvisation for its rapid transport, the Metz Detachment was practically identical to the original Carrier Pigeon unit. It is noteworthy, however, that, unlike the Ostend Detachment, the Metz unit was not organized with the bombing of some specific, long-range objectives in mind. Its activation was instigated primarily by reports of an increase in French air squadrons in the Nancy-Luneville area.[30] (*Ibid.*) In the aerial war, control of the air was rapidly becoming a transcending issue, one which would draw the bombing units away from their originally intended purpose.

Kagohls: Aerial Jacks of all Trades

The guise of the Carrier Pigeon label for Germany's first two bombardment units was dropped officially on January 1, 1916. The new name given the Ostend and Metz squadrons did not reflect, significantly enough, their primary bombing duties. More appropriately, as their forthcoming operations would soon show, each unit was designated a Battle Group or *Kampf-geschwader* of the Army High Command. The renamed units also were known as Kagohls.[31] (The name Kagohl results from the German practice of stringing words together, and then abbreviating to form an entirely new term. Kagohl is a contraction of the full, official designation, *Kampf-geschwader, Oberste Heeres-leitung*, i.e., Battle Group, Army High Command.) The original Ostend Detachment became Kagohl No. 1, while the Metz squadrons were renamed Kagohl No. 2.[32] (Neumann, *op. cit.*, p. 158.)

This change in designation marked the starting point of an accelerated expansion of German bombardment aviation. Within a short time two additional battle groups were activated. By early March the German Fifth Army, which had girded itself for the drive on Verdun, had been assigned four Kagohls for support.[33] (Hoeppner, *op. cit.*, p. 90.) In April, when the battle was in full swing, the total Kagohls had reached five.[34] (Eberhardt, *op. cit.*, p. 66.) As new battle squadrons continued to be formed, Kagohl Nos. 6 and 7 were available by summer for the reinforcement of the decimated German squadrons in the Somme sector. This rapid build-up sought to diffuse the experience of the seasoned bombing squadrons. Kagohl No. 3, for example, was formed by detaching three squadrons from Kagohl No. 1 to serve as a nucleus for the new

battle group. Kagohl No. 3 was increased later to five squadrons.[35] (Neumann, *op. cit.*, p. 164.)

Although the Kagohls were quickly increased, the rising tide of battle in 1916 all but submerged German plans for bombing operations at long-range. The largest armies the world had ever seen were locked in behind the continuous scar of the Western Front. As first the Germans, and then the British, sought to break out during that fateful year, the furious chaos of land battle was extended to the skies above the front. For German military aviation, still officially considered a noncombatant auxiliary service, it was a time of great trial and upheaval. It served, however, to make more vivid in the eyes of the Army High Command the distinct and varied roles required of its air arm. With this new experience, the High Command eventually rededicated the Kagohls to long-range bombardment, a function blurred by the white heat of ground battle for the better part of the year.

The crucial issue in the air in 1916 became mastery of the skies. In attaining this first and indispensable prerequisite, the role of pursuit aviation, unlike bombardment, had not been clearly foreseen early in the war. In the skies over Verdun, and later over the Somme, even reconnaissance and artillery spotting became virtually impossible for the Germans now confronted by the Allied airmen who lacked neither aggressiveness nor numbers. Without control of the air, all else became impossible; and lacking an adequate pursuit aviation, the Germans had no recourse but to use their nascent bombing squadrons to fill the breach.

In early 1916, the Kagohls were thrown into the raging fury of the Verdun offensive. The German High Command, marking the relentless but slow progress along the churned hills overlooking the valley of the Meuse, resolved to fight a war of positions in the skies. Instead of lifting bombs, the wings of the Kagohls were to sustain machine guns in defense of aerial trenches intended to hold back the searing attacks of French planes. By day, the Kagohls were hard pressed to do little more than defend the sky with patrols flying in fixed sectors over the German front. And night bombing operations were totally suspended by order of the High Command.[36] (Hoeppner, *op. cit.*, p. 93.) Distant targets seemed to hold little importance when compared to the crucial objective of Verdun lying just beyond the grasp of the German divisions.

The frustrating of German bombardment aviation was inherent in a strategy geared to overrunning and holding the ravaged land. It was also a consequence of the C-type airplane flown by the Kagohls. Even the C-III, which came into the line at this time, had only a single, 175 h.p. engine. Even when made in concert, their bombing attacks were but mere pinpricks. This model, however, was armed with two machine guns, one fired to the rear by an observer, and another firing forward through the propeller. Though slow and cumbersome, it was felt that the C-type airplane was needed most, not as a bomber, but as a stopgap combat machine.

As the Imperial Army was being slowed down to a crawl before Verdun, it suddenly had to reel to the defensive with the unexpected British thrust on the Somme in July 1916. German air units in that region were driven from the air by the massed sweeps of British planes. Learning from bitter battle experience, the Germans began, in the midst of the Somme campaign, to formally organize their pursuit aviation in homogeneous squadrons called *jadgstaffeln*.

These pursuit squadrons were far too few at the time to free the Kagohls for bombing operations in unit strength. The battle groups were relieved, however, from flying patrols over the lines, a tactic now recognized as futile. But for the bombing units, there remained still another task. Along the front, the artillery barrage was unquestionably more devastating than the dispersed strikes of aerial

bombs. Spotting for the artillery, therefore, was given priority over air bombardment. And the High Command decreed the use of the Kagohls for protecting the planes serving as eyes for the guns.[37] (*Ibid.*, p. 127.) This escort duty was actually a downgrading of the Kagohl's combat role. Their heavy C-type biplanes, it was realized, had little to contribute in aerial combat which had quickly advanced from tottering infancy to rugged adolescence.

By the fall of 1916, the scope and intensity of the war in the air brought on even greater changes. Organizational recognition of a combatant status for the Imperial Army's aviation became imperative. The employment of aviation at Verdun and the Somme had revealed glaring deficiencies in developing an air doctrine that kept pace with the growing demands of aerial warfare. Equally unsatisfactory was the administrative framework, headed by Major Thomsen as Chief of Aviation, which was inadequate for an arm that was quickly expanding in size and degree of specialization. And only the Kagohls were operationally responsive to the centralized control of the High Command.

By decree of the Imperial Cabinet, military aviation became a distinct corps of the German Army to be known as the *Luftstreitkraefte,* or Combatant Air Forces, on October 8, 1916.[38] (*Ibid.*, p. 132.) Just as important as its recognition as a fighting force, aviation was to be commanded for the first time by a general officer, who was also a member of the Army High Command. In November, Lt. General Ernst von Hoeppner was appointed to command "all aerial means of the Army, offensive and defensive, at the front or in the interior. . . ."[39] *(Ibid.)* His newly created post of Commanding General of the Army's air force was placed directly under the Chief of the Army General Staff. General von Hoeppner served as Kogenluft[40] (*Kommandierender General der Luftstreitkraefte*) until the position was abolished in January 1919.

This organizational structure within the Imperial Army for Germany's first air force, as established at the halfway point of the war, remained essentially the same until the end.

(Editorial Note: This historical narrative of the German air arm in World War I will be concluded in the October issue.)

* * * * *

Nothing can be more unphilosophical than to be positive or dogmatical on any subject. When men are the most sure and arrogant, they are commonly the most mistaken and have there given reins to passion without that proper deliberation and suspense which alone can secure them from the grossest absurdities.

—DAVID HUME

* * *

One of the things we have to be thankful for is that we don't get as much government as we pay for.

—ANONYMOUS

THE 6th AERO SQUADRON 1917-1947

By DR. MAURER MAURER

FOR twenty years and more the 6th Squadron prepared for that day when its planes would take to the air to defend Hawaii. But when the critical moment arrived, when enemy planes flew in to attack Pearl Harbor on that "fatal Sunday morning" in December 1941, "many of the men were in bed, some were eating." The historian of the unit reported that at the beginning of the attack the Squadron's barracks at Wheeler Field received a direct bomb hit on the mess hall. Many men were injured. At the same time bombs landed near the hangar, starting fires at several places. All but one of the Squadron's planes were destroyed. One man—Staff Sergeant Andrew A. Walczynski, the Operations Chief, who was on duty at the hangar—lost his life.

The 6th Squadron recovered from the losses it suffered on 7 December 1941, but its wartime operations were not outstanding and were, in fact, of only minor significance. Furthermore, the Squadron's record before and after World War II is not filled with spectacular accomplishments, for the unit was engaged in the routine training that generally characterizes Air Force activity in peacetime. Nevertheless, the 6th Squadron is an interesting unit because it has a long history that goes back to the days before World War I, and because a considerable number of the men who served with the unit had distinguished careers in the Air Force.

At the beginning of 1917, three months before the United States entered the First World War, the Army had only one fully organized aero squadron, the 1st, which was with Pershing's Mexican Expedition. By that time, however, the 1st Company of the 2d Squadron had been formed and sent to the Philippines; and plans had been made for five more squadrons, three (the 3d, 4th, and 5th) to be stationed in the United States, and two others for duty in Panama and Hawaii. On 30 January Captain H. H. Arnold sailed for Panama to select a station for the 7th Aero Squadron. A few days later Captain John F. Curry left for Hawaii to organize the 6th.

When Curry, who had been with the 1st Squadron, received notice of his new assignment, he requested orders to go to Washington for instructions. The Office of the Chief Signal Officer disapproved the request. It was willing to rely on his "initiative, energy, and discretion to carry out its plans." Curry was ordered to proceed at once to Hawaii.

Arriving in Honolulu on 13 February,

Curry discovered that there were no plans or instructions awaiting him, nor was there anyone in Hawaii who had any idea of what the War Department wanted. The Captain "felt free, therefore, to make all necessary arrangements and plans for the establishment of an aerial coast defense base." He evidently had already decided that the basic mission of any air units stationed in Hawaii would be to serve as "a long-range coast artillery weapon." He believed that the defense of the Hawaiian Islands would be primarily from the air, and would be based on the bombing and destruction of an enemy fleet and its transports before a landing could be effected.

Late in February, while Curry was formulating his ideas and developing plans for his base, the War Department directed that 50 enlisted men of Aviation Company "A" at Rockwell Field in California be transferred to the 6th Aero Squadron in Hawaii. One man deserted, but the other 49, with Captain John B. Brooks in command of the detachment, sailed from San Francisco aboard the *Sheridan* on 5 March and arrived at Honolulu on 13 March. On the same day, at Ft. Kamehameha, Captain Curry organized the 6th Aero Squadron and assumed command.

At Ft. Kamehameha the Squadron was strengthened with men from units of the ground troops in Hawaii, but it had no planes or facilities for flying. Curry, however, received information that his squadron would be equipped with seaplanes, so he set out to find a suitable spot for operations. After a careful survey, he decided that the logical site was Ford Island in Pearl Harbor, but his recommendation to purchase the island was lost in the confusion that developed in the War Department after the United States went to war in April. Curry turned over command of the 6th to Brooks in July 1917 and went back to the United States. In Washington, he secured approval for the purchase of the land for the station in Hawaii, and eventually, on 26 September 1918, the 6th Squadron moved to Ford Island.

In the meantime, a number of pilots had joined the Squadron and the unit had received some aircraft, including Curtiss R-6 seaplanes. Under Major Hugh J. Knerr, who was in command from August 1918 to May 1919, the 6th Squadron practiced flying and began patrolling the coast.

During the next two decades the 6th Squadron, first at Luke Field on Ford Island and later at Wheeler Field, trained and prepared to defend the Islands. In 1919, the year its name was changed to 6th Observation Squadron, the unit began work with the Coast Artillery and on numerous occasions directed the firing of coastal batteries. The following year it exchanged its R-6's for DH-4A's, and the same year it began flying at night. In 1921 it practiced "day and night liaison with [an] antiaircraft regiment" and made its "first successful interchange of radio phone messages" between a plane in the air and a communication truck on the ground. For some time after March 1921, however, the unit's activities were restricted because its allowance of aviation gasoline had been reduced drastically.

During 1922, after having become a pursuit squadron, the 6th practiced attack, bombing, coastal patrol, and communication missions, and each week it participated in the war games of the 5th Composite Group, to which the Squadron was then assigned. By that time all of the pilots, bombardiers, and gunners had been trained in air tactics, and the unit could report that it "presents a formidable array of thoroughly efficient Air Teams, capable of executing any type of mission which may be outlined . . . by G-3 Headquarters Hawaiian Department."

To carry out its defensive role, the 6th Squadron was equipped with DH-4A's until 1925, when it changed to DH-4B's. The unit was still using DH-4B's as late as 1930, but in 1927 it had obtained some PW-9A's and B's, and the following year it added PW-9C's. In 1930 it began to convert to P-12's which, in series B, C, and E, served as the unit's primary plane for several years. In 1938 the Squadron received some P-26A's and B's, but that

year it also had P-12C and E, OA-3, and B-12A aircraft. The following year it began to obtain P-36's, and in 1940 it received its first P-40's.

The training routine was interrupted frequently as the Squadron was called upon to provide men and planes for aerial reviews and demonstrations. On 4 July 1921, for example, the Squadron put on a demonstration in connection with an American Legion celebration. In the years that followed it participated in reviews for numerous Army officials, including Major General Charles P. Summerall (1922), Major General Douglas MacArthur (1930), and Major General Mason M. Patrick (1933). There were other reviews and demonstrations for such persons as the Governor of Hawaii, ex-Secretary of War Newton D. Baker, Secretary of War George H. Dern, Postmaster General James A. Farley, and Vice President John Nance Garner. In 1928 the 6th Squadron flew a "tactical threeship formation" for the Prince of Japan and members of a Japanese training squadron who were visiting Hawaii. Planes of the 6th saluted the King and Queen of Siam on their arrival and departure from Hawaii in September 1931. The records of the unit contain many references to such "aloha flights," and it seems to have been a custom for the Squadron to honor all important persons as they arrived at or left Hawaii.

In 1927, as Lieutenants Lester J. Maitland and Albert H. Hegenberger reached Hawaii at the end of the first flight from the United States, they were greeted by PW-9's from the 6th Squadron. When the lieutenants sailed for home aboard the *Maui,* three PW-9's took part in an aloha flight, but one of the planes plunged into the sea as the pilot tried to execute a roll. During memorial services the following day, a formation of Martin Bombers dropped flowers on the spot where the pilot had fallen.

Over the years the 6th Squadron lost many men and planes in accidents. The first major accident was on 18 November 1918, when a plane went into a spin at 2,400 feet and crashed into the ground; the pilot survived, but a corporal was killed. In 1920 a plane was lost during an interisland flight; all planes in Hawaii searched for ten days without finding a trace of plane or crew. That same year, while two planes were making an interisland flight, one ran out of gas and was forced to land on the coast; the plane was demolished in the surf, but the pilot and his two passengers were rescued. A DH-4A crashed and burned in 1921, killing a lieutenant and a sergeant. But there is no point in recording all of the Squadron's tragedies.

On the lighter side of the Squadron's history is a long record of victories in sports. "On June 30, 1922, the 6th Squadron was high in points in a Field Day and Smoker and were declared the champions." The next year, on a day "devoted to competitive athletics, the 6th Squadron won the Championship by a large margin." The unit won the Wheeler Field football championship in 1932, and year after year it won the award for athletic supremacy at the field. It was a sad day when, in 1938, "the Squadron lost the Athletic Supremacy . . . by 8 points."

During the 1920's and 1930's more than thirty officers commanded the 6th Squadron, and many of them went on to distinguished careers in military aviation. The first commander, John F. Curry, served as Commanding General of the Western Technical Training Command during World War II and retired in 1946 with the rank of major general. The second commander, John B. Brooks, also retired as a major general in 1946, after having served as Commanding General of the Newfoundland Base Command and of the Eleventh Air Force in the Second World War. Hugh J. Knerr, a graduate of the Naval Academy who became such an ardent advocate of airpower and of the Air Force, filled many important positions during long years of service. Other men who served as commanders of the 6th reached the rank of general. These included Edwin J. House (1922-1923), Harold L. Clark (1925), Lotha A.

Smith (1928-1929), Edward H. White (1931-1932), Ralph E. Fisher (1932), Early E. W. Duncan (1935), John E. Crosthwaite (1935-1936), Bryant L. Boatner (1936), Homer L. Sanders (1936-1937), Robert W. Douglass, Jr. (1938-1939), and Samuel E. Anderson (1939-1940). But the one who was to attain the highest rank was Hoyt S. Vandenberg, who was a lieutenant when he commanded the 6th from November 1929 to April 1931.

Under the leadership of such men the 6th Squadron prepared for combat. In the Hawaiian Department's annual maneuvers in May 1939, planes of the 6th took off from Bellows Field during a blackout and "attacked" Wheeler Field and Schofield Barracks. For the maneuvers the following year the Squadron was constantly on alert from 13 to 25 May. The men slept by their planes, which were deployed around Wheeler Field, and flew numerous missions to intercept bombers that "attacked" Hickam Field and Pearl Harbor. In May 1941 the 6th Squadron took part in maneuvers that it described as "very realistic." The "enemy" made dive-bombing "attacks" on Wheeler Field and "demolished hangars and barracks," but, the 6th Squadron reported, "our P-40's intercepted the enemy and finally drove them off."

Seven months later the story was different, for the 6th was unable to put even one plane in the air on 7 December 1941. The disaster was great, but early in 1942 more men were assigned. Again the unit, redesignated 6th Fighter Squadron, took up its defense duties. After operating for a time with P-40B's, the Squadron, in September 1942, received P-70's. Not long afterwards its designation was changed to 6th Night Fighter Squadron. Later, in May 1944, it received P-61 Black Widows.

The 6th Squadron served as part of the defense force in the Hawaiian Islands until the end of the war, but early in 1943 it was called upon to provide a detachment for night operations against enemy aircraft that were making raids on American positions at Guadalcanal. The detachment, which arrived at Guadalcanal at the end of February 1943, soon discovered that its P-70's were unsatisfactory for night-fighter operations. The P-70 did not have effective radar, it climbed too slowly, and its ceiling was too low. Consequently, the P-70's were used for intrusion and PT escort. To provide night-fighter defense for Henderson Field, the detachment depended primarily on P-38's, used in conjunction with searchlights that illuminated the enemy raiders as they came over the field. During the spring and summer the detachment claimed the destruction of a number of enemy planes, and on 13 August Lieutenant Henry Meigs II succeeded in shooting down two medium bombers within 60 seconds, an action for which he received a Silver Star from Major General Nathan F. Twining, Commander of the Thirteenth Air Force.

Long before Meigs got his two bombers, the detachment had, for all practical purposes, lost its identity as an element of the 6th Squadron. In April the men had been attached to another fighter unit, and in December 1943 the detachment was officially discontinued, the men and equipment being absorbed by the 419th Night Fighter Squadron. As a matter of fact, the men in Hawaii never regarded the detachment in the Solomons as being part of the 6th Squadron. As a result, the 6th did not claim credit for the detachment's victories over the enemy. Instead, the Squadron reported that its first victory was gained in the Marianas.

In June 1944, a few days after American troops went ashore at Saipan, a large detachment of personnel from the 6th arrived there with seven of the Squadron's new P-61's. This detachment began operations on the night of 24 June, when two planes were scrambled. Neither made contact with the enemy. The next night two P-61's went out on patrol. The first returned and landed safely, but when the second landed it crashed into the first. Both planes caught fire, and both crews (two men each) lost their lives. On the third night a P-61 on patrol encountered an enemy plane, but both the plane and the controller lost contact before the P-61

could close. The same night another P-61 had no better luck because the enemy dropped chaff and broke the radar contact. On 27 June, however, the crew of a P-61 reported that they had damaged, and perhaps destroyed, an enemy plane about 40 miles north of Rota.

Eight more nights passed before the detachment recorded its first clear claim on 6 July 1944. At 2100 that night, Lieutenant Francis C. Eaton, with Lieutenant James E. Ketchum as radar officer and Sergeant W. S. Anderson as observer-gunner, took off to relieve the plane on patrol. Shortly after take-off, the P-61 was fired on by a surface vessel, but by diving and banking sharply, Eaton was able to avoid the fire. A little later control vectored the P-61 toward a bogey four miles away. Ketchum picked up the enemy and Eaton closed, but the burst from the P-61 apparently was without effect. Once again Eaton came up on the rear of the enemy, a twin-engine medium bomber; this time the "Betty" exploded. As Eaton pulled up to avoid collision, there was a second and more violent explosion. Eaton and his crew could report "one destroyed."

The detachment, which kept one plane on patrol and two ready for scramble each night, recorded other victories in the weeks that followed, but more often than not, contact was lost before the enemy could be intercepted. As time went on, the number of enemy raiders diminished. Finally, in May 1945, the detachment on Saipan returned to Hawaii.

In the meantime, the 6th Squadron in Hawaii had been called upon to provide trained men for night-fighter operations in other areas. Early in 1945, for example, it had sent some crews to Iwo Jima for duty.

In many respects, the 6th Squadron was the victim of unfortunate circumstances in the years 1941-1945. It was one of the units that, as ill-luck would have it, were stationed in Hawaii when the Japanese attacked. For the remainder of the war the main body of the unit was kept on defense duty in the Hawaiian Islands. The elements that were sent to more active areas were severely handicapped by the kind of equipment they had to use. The type of duty to which the detachments were assigned was not conducive to the development of an outstanding combat record.

In July 1946 the Squadron moved from Hawaii to Japan, where it continued its training, flew surveillance missions over occupied territory, and took part in maneuvers that called for interception and strafing. At first the Squadron was stationed at Atsugi Air Base. Later it was at Yokota, and on 1 February 1947 it moved to Johnson Air Base.

The Squadron was then approaching an anniversary that, as its historian noted, would mark "thirty years of continuous service." It had long been a custom in the 6th to celebrate "organization day" on 13 March each year. The Squadron, through no fault of its own, had not made a brilliant record in combat, but it had grown up with the Air Force, and its men were proud of its long career. That career was brought to an abrupt end, however, by an order from the War Department. On 20 February 1947, three weeks before the thirtieth anniversary, the men and equipment were transferred to another organization in Japan. Since that day the 6th Night Fighter Squadron has been on the list of inactive Air Force units.

"JUSTICE WITH VICTORY"

The History of the 95th Bombardment Wing

By KENN C. RUST

The author served with the 106th Infantry Division in World War II, was captured in the Battle of the Bulge, bombed by the RAF Bomber Command while being transported through Frankfurt, and spent the rest of the war in Stalag IVB, fifteen miles south of Berlin. He was liberated by the Russians in late April. He is a member of the American Aviation Historical Society and a free-lance writer of growing repute.

THE 95th Bombardment Group (Heavy), that was to take the motto, "Justice With Victory," was activated 15 June 1942 at Barksdale Field, La. Activated with the Group were the 334th, 335th, 336th, and 412th Bombardment Squadrons (Heavy). Eleven days later the Group was transferred, without personnel, to Pendleton, Oregon, and in August to Geiger Field, Washington.

At Geiger the Group began its actual formation and was assigned its first commanding officer, Col. Alfred A. Keesler. As training progressed, the Group moved to the mud flats of Ephrata, Wash., returned to Geiger and then moved, on 17 Dec. 1942, to Army Air Field, Rapid City, So. Dakota. Three months of night and day flying followed, three aircraft and two crews were lost, but on 11 March 1943 the Air Echelon was ready for overseas movement.

The final processing and inspections were made at Kearney, Nebraska, after which the Group's aircraft, new Boeing B-17-Fs, headed for the southern ferry route flown by their own crews. After the final briefing at Morrison Field, Fla., the planes took off at five-minute intervals. They flew via Puerto Rico to Trinidad, Georgetown in British Guiana to Natal, Brazil and then over the South Atlantic to Dakar. They next staged through Marakech, French West Africa, for the final leg into England and the Eighth Air Force.

The 95th Group's first station in England was Alconbury from which the first missions were flown. This first aircraft was lost on 14 May during an operation to Antwerp. But tragedy was not to strike the airmen alone. On 27 May, while still at Alconbury, proof of the lethal game the men were now a part of, was brought home with sudden impact.

The crews were loading their aircraft —linemen, ordnance men, armorers, all of the many trades were busy around the planes—when without warning, the load on one ship detonated with a terrible blast. No one ever knew why. The plane disappeared, its ground crew with wounded. Four B-17s were crumpled like paper toys. Eleven others suffered it. Debris rained from the sky. Nineteen men were killed and twenty seriously major damage. The engines of the exploded aircraft were never found. It was the worst ground disaster the Group would ever taste. The planes which were lost that morning could be replaced, but never the highly trained ground crewmen who died that day.

Before May was out the Group moved

to its own station at Framlingham, Suffolk. On 13 June 1943 the Group's ninth mission was scheduled. It was exactly one month since its first, and the target was the U-Boat yards at Kiel, Germany.

The 95th led the 402nd Combat Wing (Prov) with Brig. Gen. Nathan Bedford Forrest as Wing Commander in the lead aircraft. They headed out over the North Sea to Heligoland, where some one hundred Luftwaffe fighters fell upon the Wing. In those days there were no escort fighters at that range, and the 95th took the brunt of the first assault.

Bf-109s and Fw-190s tore right through the formation in daring attempts to break it up. Gunners drew bead after bead on the darting fighters. Forts fell away smoking, still the 95th led the Wing to the target through heavy and accurate flak. The air battle continued, back to the North Sea. The Wing lost 22 aircraft that day, the 95th lost 10 of those —including the lead aircraft with General Forrest which went down right after bombs away. Only six aircraft of the formation succeeded in returning to England. The Group had taken a terrible beating, many chairs were empty at mealtime that night, but the Group would go back again, battered maybe, but not beaten.

Two days after Kiel the Group moved to their permanent base, AAF Station 119 at Horham, Suffolk. Colonel John K. Gerhart took over command of the Group on 22 June 1943 and the missions began adding up — sub pens in France, Trondheim in Norway, the Ruhr, and then it was 17 Aug. 1943.

The target was the Messerschmitt complex at Regensburg, and there was many an aircrewman who gulped that morning when he saw the route in the briefing room. They weren't coming back to Horham, they were going on, south over the Alps and Mediterranean to North Africa. For this mission the Group was a part of the 3rd Bombardment Division, and with that Division won its first Distinguished Unit Citation.

For four and one-half hours the Division was subjected to persistent and savage assaults by 109s and 190s. Despite desperate attempts by these fighters to scatter the bombers the Division maintained a tight defensive formation, fought their way to Regensburg and released their bombs with telling effects on the Messerschmitt factories. When they turned south instead of turning back for England they threw the Luftwaffe completely off, and the rest of the trip was made without fighter opposition. Heavy losses had been suffered—24 aircraft of the Division had been lost. Four of these were from the 95th, which claimed 28 German fighters destroyed. Once again the Luftwaffe, for all its desperate efforts, had not stopped the bombers.

The battle continued — Bordeaux, Paris, Emden, Bremen, and on 9 October 1943, the 95th Group took part in the now famous exhibition of precision bombing against the Focke Wulf plant at Marienburg. Two of the Group's aircraft were lost, but the target suffered devastating damage.

The next day the Eighth Air Force target was the rail and waterways of Munster, and the Luftwaffe had something new in its bag of tricks. For the first time the black fighters concentrated their full weight on one group at a time.

That day the 95th led the 3rd Division on a flight of 520 miles to Munster. When the escort fighters reached the limit of their range and withdrew, the waiting Luftwaffe struck. Approximately 250 enemy fighters, Fw-190s, Ju-88s, Me-110s, and Me-210s centered their entire weight of attack on the 13th Wing. The low group, the 100th, was all but wiped out losing 12 of 13 aircraft; then the high group was savagely mauled, and finally the lead group, the 95th, was hit.

Twin engined enemy fighters, firing 20 mm. and 30 mm. shells and rocket projectiles, attacked the 95th in staffels of 12 to 15 aircraft. Still the 95th held a tight, cohesive formation. It rallied the remaining aircraft of the Wing and led a six-minute bombing run through intense and accurate heavy flak.

The bombing results were superior with the 95th scoring tops. Thirty-six percent of the Group's bombs hit within 1000 feet and 69% were within 2000 feet of the aiming point. Three more 95th aircraft were lost before withdrawal fighter support was met. In all the Group lost five B-17s, the Wing lost 25. Although German records show the loss of only 22 fighters that day, there is no denying that what transpired over Munster was one of the greatest air battles ever fought. The 95th won its second Distinguished Unit Citation.

Four days later the 95th went to Schweinfurt and the second greatest air battle over Germany. This time the Luftwaffe didn't concentrate on the 95th. They picked another wing and other groups, and the 95th lost only one aircraft as Winter 1943-44 came to Europe.

Targets that winter were in every corner of Europe. In February there was the great series of attacks against the centers of German fighter production. Still, the biggest and toughest target of them all — Berlin, remained untouched. Big B, as it came to be called, had a special meaning to the 95th Group. It was the letter that identified the Group— the big black B in a white square on its B-17-Gs, that was the 95th. It seemed fitting that the "B" group be the first over Big B itself.

On the 3rd of March the Eighth Air Force launched a "maximum effort" against military targets in Berlin. Solid cloud formations exceeding 30,000 feet in altitude forced a recall of this mission. Some of the planes dropped on targets of opportunity, the rest came home with their eggs. Ground crews grumbled and unloaded the bombs they'd loaded only a few hours before. They unloaded them, stored them, and then got the order — load 'em back aboard.

On 4 March 1944 the target was once again — Berlin. At take-off a snowstorm swirled over the field. Weather in other parts of England was so bad that the 2nd Bombardment Division couldn't even get off the ground. Group after group had to give up assembly plans because of the treacherous, enveloping cloud formations. Others formed and headed for alternate targets. But, weather or not, one wing was out there, heading for Big B. That was the 13th, composed of 12 aircraft of the 100th Group and led by 19 aircraft of the 95th Group.

Clouds piled to what seemed like the top of the sky, and heavy contrails made formation flying a peril even in itself. The recall for all aircraft was sent out from Division. The Wing didn't receive it, at least that's what they said. They stuck it out, headed east through tumbling clouds and icy cold, and they got there — to Big B. The 95th was the first U. S. bomber group over Berlin, and there was a reception committee made up of some thirty members of the Luftwaffe. But the Wing stuck to a tight formation, went over the target and laid their eggs. Behind them they left 42½ tons of bombs on Berlin, three enemy fighters shot down and four B-17s. Nine other aircraft had been damaged. Berlin had suffered its first daytime attack — the impossible had been achieved.

Two days later the Eighth Air Force went to Berlin in full force, and there followed the greatest air battle in history. Sixty-nine U. S. bombers went down that day, eight from the 95th Group. On the 8th and 9th of March they went back again, no more aircraft were lost by the Group and Berlin became just another target.

The bombing offensive mounted higher through April and May and culminated for the 95th with three missions on D-Day, 6 June 1944. Two weeks later, on 21 June, came another first. Thirteen aircraft of the 95th flew out from England as part of a task force that bombed Ruhland south of Berlin, and proceeded on to Russian bases near Mirgorod. From there Drohobycz, Poland was bombed on 26 June and the aircraft flew on to Foggia in Italy. On 5 July 1944, two weeks after leaving England, the 13 aircraft hit Beziers, France on their return to Horham.

On 18 September the 95th participated in another shuttle mission to Russia dropping desperately needed supplies to General Bor's embattled Polish troops at Warsaw. In late December the Eighth Air Force hammered German communications behind the lines of the German Ardennes offensive until the Bulge was eliminated. The 95th was fully engaged in this campaign. After that it was a downhill fight. On 20 April 1945 the Group flew its 321st and last mission of the European war to Oranienburg, Germany. On 8 May the war in Europe was over.

In two years the 95th Bombardment Group had dropped 19,611 tons of bombs on its targets, destroyed 468 confirmed enemy aircraft, and probably destroyed or damaged 352 others. They were attacked by 2,730 enemy aircraft and better than 1,500 planes received battle damage. In combat 151 aircraft were lost and 1,455 men were listed as missing in action.

On 19 June the Air Echelon departed England for the United States flying by way of Prestwick, Iceland, Goose Bay, and landing at Bradley Field, Connecticut on 21 June 1945.

The Ground Echelon returned to the States on the Queen Elizabeth in mid-August. The Group was inactivated on 28 August 1945 at Army Air Field, Sioux Falls, So. Dakota.

On 29 May 1947 the 95th Bombardment Group (Very Heavy) was activated at Memphis Municipal Airport, Memphis, Tenn., as part of the Air Defense Command. Between that date and 30 Sept. 1947, the Group's four squadrons were reactivated, and the Group, acting as a reserve unit, was further assigned to the 21st Bombardment Wing.

During the next two years the Group was attached to the Continental Air Command, Ninth Air Force, and finally on 1 Feb. 1949, back to the 21st Air Division of the Fourteenth Air Force. Effective 27 June 1949 the Group was again deactivated — at Memphis Municipal Airport, Memphis, Tenn.

Three years now passed before the unit was once again reactivated and began the slow process of becoming a front line outfit. On 10 June 1952 the 95th Bombardment Wing (the term Wing had supplanted the term Group in 1952) was activated at Biggs Air Base, El Paso, Texas. The 334th, 335th, and 336th Squadrons were also reactivated, but until 15 Oct. 1952 the entire organization remained in a programming stage with no equipment. At that time the Wing was changed from a medium (B-50) to a heavy (B-36) category. On 31 August, the first B-36-D type aircraft for the Wing arrived at Biggs, and the first B-36 training sortie was flown on 11 September.

In 1955, between 8 July and 19 November, the entire Wing carried out its first deployment to an overseas station on temporary duty and returned without incident. On 17 Feb. 1956 the Wing received the first two B-36-H aircraft programmed in its conversion to H and J model aircraft. The conversion was completed 10 September when the last D model was put into storage. (On 1 March 1957 the Wing entered the Strategic Air Command Hall of Fame for having 12 consecutive months of accident-free flying.)

With the phase-out of reciprocating engine aircraft by all SAC units, the 95th Bombardment Wing began phasing out its B-36 aircraft 26 Sept. 1958. At the same time personnel of the Wing began attending conversion courses for the Boeing B-52 jet bomber. In 1959 the Wing re-equipped with this type aircraft to attain a new and far greater potential than ever before in its history.

Today, the 95th Bombardment Wing (Heavy), with a long and proud heritage of almost two decades, is based at Biggs Air Force Base, Texas, and is assigned to the Fifteenth Air Force, Strategic Air Command.

LETTERS TO EDITOR . . .

Dear General Anderson:

Dr. Staton's article, "The Battle For Men's Minds" in your April 1960 issue of *The Airpower Historian* is the best I have ever read on the subject. It merits the widest dissemination.

Sincerely yours,
BEN HAMILTON
Hampton Books
Hampton Bays, N. Y.

Dear General Anderson:

Enclosed is the selection list for Trustees that I have chosen from the list of twelve.

May I once again congratulate *The Airpower Historian* on its selection of material in the April 1960 issue. Of particular interest to me is the report by Capt. Robert F. Works, EAB, concerning Hitler, as derived from formerly classified intelligence sources.

The material by Dr. Thomas F. Staton, "The Battle For Men's Minds" should be required reading for those "willy-nillys" who would pacify the Soviet Union with "apologies" for the U-2 flight. My personal opinion is that our President handled the incident in a spirit of lofty tradition that has really gotten under the skin of the USSR.

Respectfully,
FRANCIS S. DUNN
M/Sergeant, ANG
Springfield, Ohio

Dear General Anderson:

Enclosed is my personal check for $3.00 to cover annual membership fee.

In addition I wish to express my appreciation for your editorial policy. "Thesis on Decline" in your October publication was a very thought-provoking and stimulating study of our nation's struggle for survival against the Communist world. I heartily support this type of editorial policy, and am looking forward to future publications.

Respectfully yours,
LeROY K. HEIDBREDER
Captain, USAF
James Connally AFB, Texas

Dear General Anderson:

If a General is nice enough to send me a letter for my dues, the least I can do is reply in kind. The work you are doing is good for the Air Force, for our Country, and for those of us who are on the edges of the Air Force bonds. Sometimes these bonds stretch pretty thin with all the problems that come upon us. Through *The Airpower Historian*, however, we manage to keep alive the basis, more so than with any other single media or influence source.

So, more power to you, and may you keep up these activities for many happy years ahead.

Cordially yours,
JOHN V. ADAMS
Lt. Colonel, AF Res.
Douglaston 62, N. Y.

Dear General Anderson:

Thank you very much for your warm welcome back to the Z. I. Although we thoroughly enjoyed our tour in England because we were able to visit the continent also, it's nice getting back to the good old USA.

It's always a pleasure to receive a letter from you as a representative of the Historical Foundation. I don't see how you find it possible to keep up with the activities of each member of the Foundation, but you always seem to manage. It makes one feel like more than just one of the very many, and has kept relations on a more personal plane.

You can rest assured that your efforts are not in vain. Thanks once again. I have inclosed a check for my annual dues.

Sincerely yours,
JOHN B. VOSS
Captain, USAF
Bergstrom AFB, Texas

Airpower Book Review

DEFENSE POLICY AND STRATEGY, by Air Vice-Marshal E. J. Kingston-McCloughry, London: Frederick A. Praeger, Inc., New York, 1960, $6.00.

Anyone concerned with a sustaining national welfare will profit from an expanded understanding by reading this book — if he leave his preconceptions and vested interests on the shelf while he browses through it.

The author treats with the present global crisis in a comprehending manner. He effectively discloses recognition that present policies and strategy do not reflect competence to treat with the challenge of the revolutionary processes of communism as a method of conquest and expansion.

The author presents a multiplicity of proposals for alleviating the incongruities of current strategy and military posture. In these efforts at solution he is hampered by conviction that the Army, Navy, and Air Force will endure as distinct categories of military conflict, and that improvement can only be gained by modification of features and objectives in these separate and competing military forces. Here he makes a heavy concession to the patterns of an outmoded past, but his conclusions may be sound. History clearly records the adamant stand of military bureaus in meeting the demands for adjustment to ever-changing military values.

The author accepts the cliché that in any purposeful war fought to decision civilization will be destroyed, and a decision can, therefore, never be reached. He then moves on to endorse limited or "little wars," with a backdrop of deterrent forces to keep them small. It is disturbingly disclosed that these "little wars" are to be fought to maintain position, not improve it. This could conduce to a strategy of surrender by installment.

The reasoning processes of the author reflect a recognition of the jeopardy Great Britain faces today because of her exposed position and vulnerability to nuclear weapons. There is sound justification for any valid proposals that could reduce these hazards. The book makes for palatable reading and is highly thought provoking.

O. A. A.

WAR IN THE MODERN WORLD, by Theodore Ropp, Durham, N. C.: Duke University Press, 1959, $10.00.

War has not enjoyed its share of dispassionate attention from American scholars until very recent years. Historians of military affairs of all nationalities have also tended to be parochial for patriotic or other reasons, not to mention the intellectual dictates of favorite principles or of close-by wars. Literary historians have prospered on their selected "great captains" or the blood and inhumanity of colossal disasters. In parallel ranks with the muscle-powered cavalry and infantry, the technologists have had their decisive weapons or key inventions. And, the sociodiplomatic causes and results of wars among nation-states in modern times have been rather well footnoted.

But here is a first book by an American scholar after twenty pioneering years of teaching military history on a civilian campus which seems destined to become the standard work in English.

The excellence of *War in the Modern World* by Professor Ropp of Duke University stems from three major judgements in the eyes of this reviewer. First, with meticulous research it interrelates political, technological, and organizational groups of factors influencing the nature as well as the role of warfare in the history of the modern world. Secondly, with moving text it is soundly analytical and thought-provoking to both the lay and professional reader. And thirdly, its documentation has no peer as a reliable launching pad for sustained study and reflection. It comes as close as any volume will to filling the long-felt need for a balanced single volume history of military affairs, broadly considered.

The touchstone to Professor Ropp's thesis is his stated intent to interrelate political, technological, and organizational factors in his survey. To stress the importance of one or the other of these groups of factors he submits, is quite misleading. "Such partial views of a complex social phenomenon are usually false." (p. xv) War, by its definition distinct from other kinds of social violence, is a conflict between political states. Yet

the classical "political-economy" view of war as stressed by Clausewitz is necessarily inadequate to embrace the ever-increasing significance of technology as a major influence upon the art and science of warfare. The institutional, administrative, and organizational factors in military history, also evidencing the impact of technical change, involve scientific research, weapon development, logistics, leadership, command, morale, strategy, tactics, and doctrine. These too are important but by themselves provide incomplete explanation. Professor Ropp largely succeeds in what he set out to do — synthesizing a coherent thesis. And this, in turn, provides fresh insight into the broader impact of technology upon society.

The proof is in the pudding, but it can only be outlined here. The first part of the volume is devoted to the Age of the Great Captains. He traces land and naval warfare from the Renaissance to the Neoclassical Age (1415-1789) in two brilliant chapters. He then examines traditional Anglo-American military thought and devotes a chapter to the impact of the French Revolution and Napoleon.

The second part of the volume is devoted to the Industrial Revolution and its impact upon war in the 19th century. He examines in some detail the wars of the mid-century and the uneasy peace between 1871 and 1914. "The Age of Violence" covering the World Wars and the twenty year armistice sandwiched between them is the final part of the volume. American readers will find his narrative on the Russo-German front particularly instructive, not to mention the nature of war when a nation is subjected to devastating attack through the medium of air space. Ropp's Epilogue treats with a bipolar world in the era of global-legged vehicles armed with city-busters which came into being during the short decade after the end of World War II.

The unhappy problems of protracted cold war, civil defense, limited war, and total war in the seventh decade of the twentieth century are defined from a historical perspective. General Douglas MacArthur's words that "war must go" and Sir Winston Churchill's on "survival the twin brother of annihilation" — these are meaningfully based upon the context of all previous pages. Today, it seems of great urgency indeed that the instruction of B. H. Liddell Hart be oft repeated: "If you wish for peace, study war."

Like any massive survey, this volume is not free of minor defects. These may disturb some specialists, but do not really detract. His documentation, for example, is almost wholly to books generally available. While a masterful digestion within manageable space, Professor Ropp annotates his bibliography with old-fashioned gusto so often lacking in contemporary historical publications.

In short, this book seems indispensible as an intellectual stimulus for any serious student of history. First-rate history, Professor Ropp's contribution is also worthy of most superlatives in helping ground the present-day world upon substantive fact, not theory. No overfacile solution for the crucial problem of waging effective peace in our time of troubles and technology will be found in this volume. Yet the problem seems the clearer for it.

EUGENE M. EMME
Historian, NASA

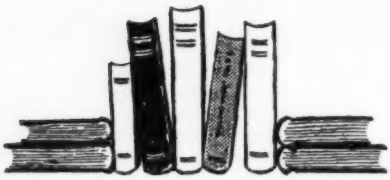
MAN HIGH, by Lt. Colonel David G. Simons (MC) USAF with Don A. Schanche: Doubleday & Company, Inc., Garden City, New York, 1960, $4.50.

Man High is an account of thrilling, real life adventure in the space age. Colonel Simons, vividly reports not only on his own record-breaking flight above 100,000 feet, but also on two other manned ascents related to the program which were equally exciting and uniquely hazardous.

The reader cannot help but soon identify himself with the small team of individuals concerned with *Man High* project and share their enthusiasm, frustration, impatience, anxiety, relief, and elation as these reactions are evoked. Much is revealed concerning the personal characteristics of the participating space scientists — their individuality, thoroughness, competence, mutual respect, interdependence and reliance on fellow team members; their daring, courage, and selfless devotion to their objective.

In true scientific spirit the contributions of *Man High* are dedicated to improving selection for, and enhancing the safety of, future manned flights into space. One senses that the wonderment and awe, admittedly inadequately described by these border-of-space observers, can only be appreciated by going there.

WALTER A. CARLSON
Colonel, USAF, MC



RECENT BOOKS

ADAMS, FRANK DAVIS, *Aeronautical Dictionary*, Washington: U. S. Government Printing Office, 1959. $1.75.

AIR FORCE PAMPHLET 210-1-1, "A Chronology of American Aerospace Events," Washington: Department of the Air Force, July 1, 1959. Events listed chronologically from 1903 to present by year and by day.

BERGAUST, ERIK, *Rockets of the Air Force*, New York: Putnam's, 1960. $2.50. A brief discussion of missiles in general, plus a specific catalog of leading models and releasable characteristics.

BOUSCAREN, ANTHONY T., *A Guide to Anti-Communist Action*, Chicago: H. Regnery, 1959. $4.00. The author feels that U. S. reliance on the deterrent power of nuclear weapons has created a trend to the advantage of the Soviet Union. He recommends a capability to cope with either nuclear wars or "brush fire" wars.

CAIDIN, MARTIN, *War for the Moon; the Inside Story of the U. S. and Soviet Lunar Probes and Man's Coming Flights to the Moon*, New York: Dutton, 1960. $4.95.

COOKE, DAVID C., *Racing Planes That Made History*, New York: Putnam's, 1960. $2.50. A photo album of the ships of U. S. aviation development during the pre World War II years.

JASTROW, ROBERT, *The Exploration of Space*, New York: Macmillan, 1960. $5.50. Aimed at the semitechnical reader.

LUZAR, RUDOLPH, *German Secret Weapons of the Second World War*, New York: Philosophical Library, 1959. $10.00. A valuable tool for the military student and a fascinating evaluation of Germany's weapons and their use.

MacMILLAN, NORMAN, *Great Aircraft*, New York: St. Martin's Press, 1960. $5.95. One of Britains most prolific aviation writers picks ten planes on the basis the plane itself played in shaping aviation.

MATLOFF, MAURICE, *Strategic Planning for Coalition Warfare, 1943-1944*, Washington: U. S. Government Printing Office, 1959. $5.00. Problems of modern warfare when allies try to combine their services to the attainment of a common end.

PEETERS, PAUL, *Massive Retaliation: The Policy and Its Critics*, Chicago: Henry Regnery Co., 1959. $5.00. An excellent analyses of the policies this nation has followed since World War II.

SUCHENWIRTH, RICHARD, *Historical Turning Points in the German Air Force War Effort*, Maxwell AFB, Ala., Research Studies Institute, Historical Division, Air University, 1960. (Historical Study No. 189)

TOLAND, JOHN, *Battle: The Story of the Bulge*, New York: Random House, 1959. $4.95.

WEDEMEYER, GEN. A. C., *Wedemeyer Reports*, New York: Holt, 1960. $6.00. Problems of strategic planning, difficulties stemming from national interests and a historical view of how the present world situation developed.

WYKEHAM, AVM. PETER, *Fighter Command*, London: Putnam & Co., 1960. £1 10s. A dramatic and fantastic story of the planning organization, growth, and employment of the RAF in war.

VAGHTS, DR. ALFRED, *A History of Militarism*, London: Hollis and Carter, 1959. 42s.

RECENT ARTICLES

BELL, WILLIAM GARDNER, "John P. Mitchel . . . Pioneer Airman," *Air Force*, Vol. 42, July 1959, pp 112-114.

BERLE, ADOLF A. JR., "The Irrepressible Issues of the 60s," *Vital Speeches*, Vol. 26, May 15, 1960, pp 450-452.

BERLE, ADOLF A. JR., "The Communist Invasion of Latin America," *Reporter*, Vol. 23, July 7, 1960, pp 23-25.

BLAIR, CLAY, "Pilots Aren't Obsolete Yet," *Saturday Evening Post*, Vol. 232, April 23, 1960, pp 31-32.

BROGDEN, STANLEY, "The New Luftwaffe," *Air Power*, Vol. 7, Spring 1960, pp 209-215.

DALE, EDWIN L. JR., "The Case for Optimism," *Yale Review*, Vol. 49, June 1960, pp 481-487. Dale lists several international developments which give cause for believing the U. S. is winning, not losing, the cold war.

DAVIS, THOMAS R. A., "Man Alive in Outer Space," *Atlantic*, Vol. 205, March 1960, pp 39-44. Scientific precautions needed to ensure that man can be projected into outer space and return alive.

DEGLER, STANLEY E., "The First Satellite Trip," *Space Age*, Vol. 2, March 1960, pp 4-9.

FISHER, ALLAN C. JR., "Exploring Tomorrow with the Space Agency," *National Geographic*, Vol. 118, July 1960, pp 48-89.

KOTSCH, WILLIAM J., "Weather Control and National Strategy," *U. S. Naval Institute Proceedings*, Vol. 86, July 1960, pp 74-81.

KRAFT, JOSEPH, "RAND, Arsenal for Ideas," *Harper's*, Vol. 221, July 1960, pp 69-76. Description of this research and development organization.

LeMAY, GEN. CURTIS E., "Artists Roam the World of the U. S. Air Force," *National Geographic*, Vol. 117, May 1960, pp 650-673. Twenty-four paintings showing the spirit and life of the Air Force in an historic decade.

MORGENSTERN, OSKAR, "Goal: An Armed, Inspected, Open World," *Fortune*, Vol. 62, July 1960, pp 93-95. An alternative to the blindfolded arms race, he calls the worst of all possible cold-war worlds.

MURPHY, CHARLES J. V., "The Plane Makers Under Stress," *Fortune*, Vol. 41, June 1960, pp 134-137. The airplane industry is concerned over its uncertain future.

PHILLIPS, FREDERIC M., "Brave Men and Muslin Airplanes", *Air Force*, Vol. 42, July 1959, pp. 40-44. Account of work of Orville Wright, Benjamin D. Foulois, and Frank P. Lahm.

WITZE, CLAUDE, "Can an Airborn Alert Prevent a Space-Age Pearl Harbor?" *Air Force*, Vol. 43, March 1960, pp 33-37.

WOHLSTETTER, ALBERT J., "Another Look at the Importance of Overseas Bases," *Air Force*, Vol. 43, May 1960,

"The Air Force," *Forbes*, Vol. 85, June 1, 1960, pp 15-28.

"Biological and Chemical Warfare; An International Symposium," *Bulletin of the Atomic Scientists*, Vol. 16, June 1960, pp 226-256.

"The Budget and National Security," *Current History*, Vol. 39, July 1960, pp 1-6.

"The Cold War," *Newsweek*, Vol. 45, May 30, 1960, pp 21-28. A summing up of events such as the U-2, The Berlin question, economic competition, and outlook for the future.

"Defense Is Big Business: The Air Force and the Economy," *Forbes*, Vol. 85, June 1, 1960, pp 11-28.

"Future of the World," *Nation's Business*, Vol. 48, May 1960, pp 46-48.

"New Accent on the Air Reserve Forces," *Air Force*, Vol. 43, July 1960, pp 103-118.

"SAC in Transition," *Aviation Week*, Vol. 72, June 20, 1960. Special issue.

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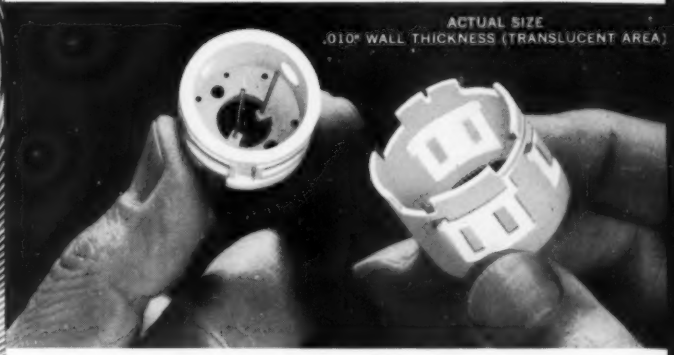

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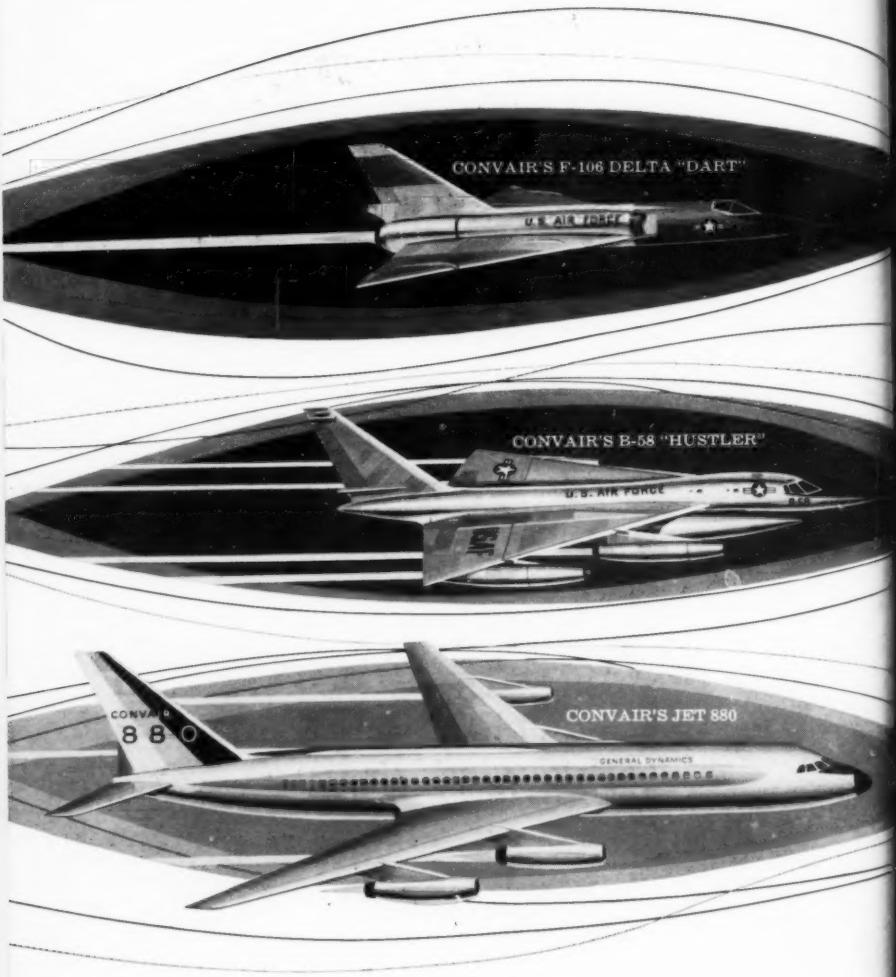

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